Coal Age

JULY, 1953

A McGRAW-HILL PUBLICATION—PRICE 50c

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CONSTANT PERFORMANCE

NO TIME OUT FOR REPAIRS

The 'constant performance' of A.C.F. Mine Cars is based on three simple facts.

1. Production can't stop... because a damaged car can be quickly switched to a siding for repairs. 2. Extreme simplicity of design permits easy on-the-spot repairs by your own men. 3. A.C.F. Drop Bottom design lets you unload on-the-run... as much as a ton a second!

These are the real reasons why so many mine operators use A.C.F. Mine Cars. They also get a worry-free, trouble-free transportation system that provides constant haulage. Get the full facts from your A.C.F. Representative today.
American Car and Foundry Company, New York · Chicago St. Louis · Cleveland · Philadelphia · Huntington, West Va. · San Francisco · Washington · Berwick, Pa.

for Constant Haulage A.C.F. MINE CARS

B. F. Goodrich cord belt gives double protection against mildew

MILDEW is a belt killer, especially in coal mines. With most conveyor belts there's nothing to keep moisture from seeping through cover cuts and wicking across the absorbent plies of fabric in the carcass. The belt fabric rots, the belt fails prematurely. There are two reasons why this can't happen to a Caricoal *cord* belt, made by B. F. Goodrich.

Cords sealed in rubber

In this exclusive B. F. Goodrich design, there's a ply of parallel cords, running lengthwise, built into both the top and bottom of the belt. Each cord is completely surrounded by rubber—no cross threads tie them together. A cut in belt admits moisture or damaging acid to only those few cords exposed. There are no cross cords to wick moisture across belt width.

Mildew inhibitors prevent rotting

As an added protection, Caricoal belts are treated with mildew inhibitors. These chemicals act directly on fungus spores, effectively inhibit belts against attack from mildew.

Cord belt at work

Mildew resistance is important in the mine where this picture was taken. That's why the owners selected the Caricoal belt with cord construction. There's been absolutely no sign of mildew and the belt looks good for years' more service.

If exposure to moisture and mine acids is shortening the life of your coal-handling belts, you need a Caricoal cord belt. Let your BFG distributor show you how these longer-lasting conveyor belts can save you money. *The B. F. Goodrich Company, Industrial & General Products Division, Akron, O.*

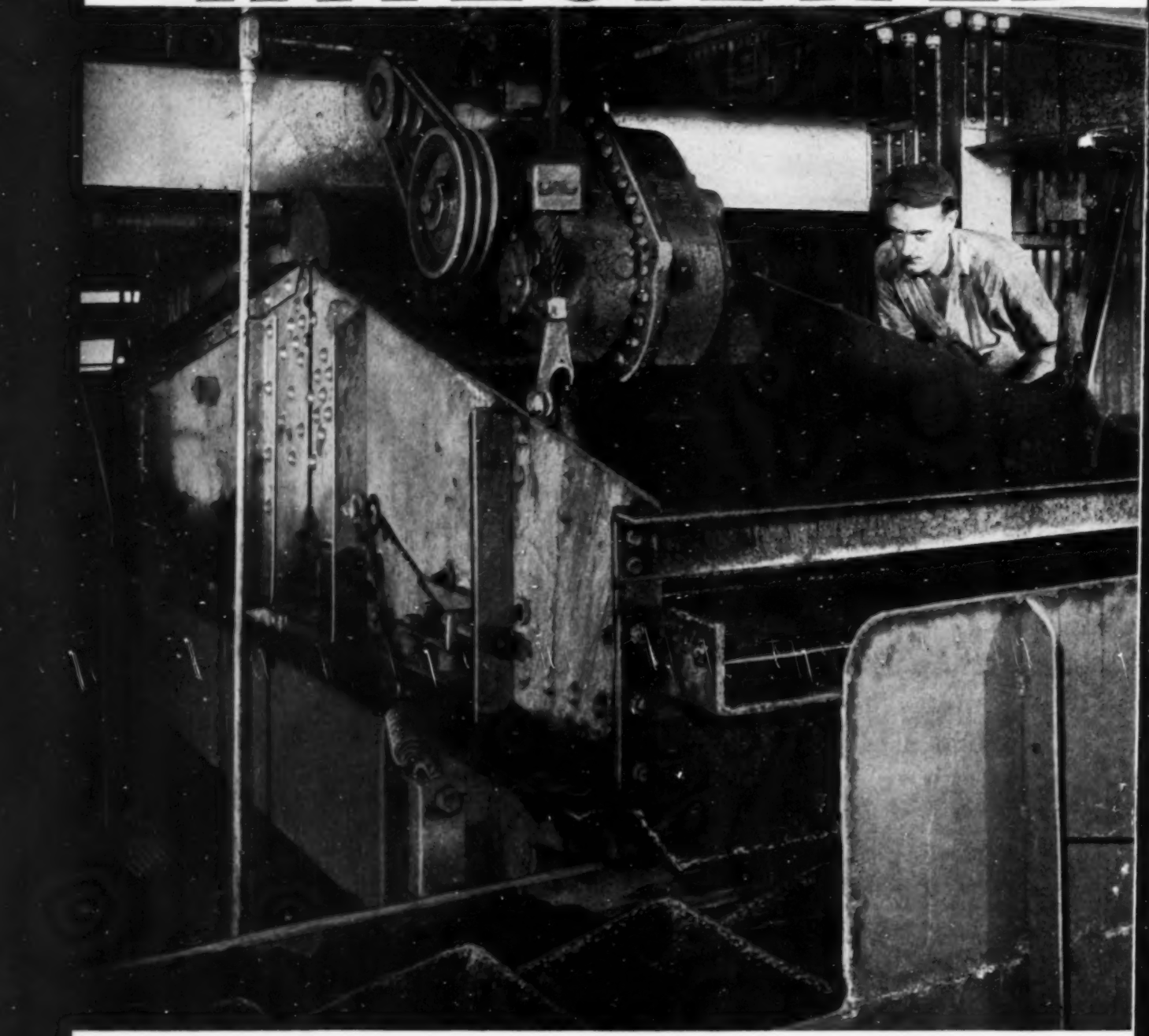
Caricoal Conveyor Belts

BY

B.F.Goodrich

RUBBER FOR INDUSTRY

INTEGRATED



Allis-Chalmers vibrating screens are available in three basic types in a complete size range with modifications of each type. Applications include sizing dry or moist coal, dewatering, sink-float, heavy media pre-wetting and recovery, sludge screening.

Thermo-Deck, Tesrope and Vari-Pitch are Allis-Chalmers trademarks.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS

equipment...

IMPROVES COAL QUALITY
CUTS PROCESSING COSTS
INCREASES TONNAGE!

Upgrading coal to meet the requirements of today's big markets in metallurgical, chemical and power industries calls for the coordination of equipment best suited for each processing operation. Only through the teamwork of integrated equipment can you get these benefits:

- **Maximum efficiency of men and machines.**
- **Important processing economies.**
- **Big production increases.**

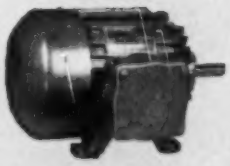
Largest of any manufacturer in range of industrial equipment, Allis-Chalmers offers a broad choice of equipment types and sizes. This means that Allis-Chalmers can make a truly *unbiased* recommendation for each job. It also means coordinated research and engineering and the right-for-the-job integration of machine, motor, drive and control . . . integration that produces more and better coal . . . integration that affords the obvious advantages of total responsibility for overall operation.

Allis-Chalmers field engineers are equipment application specialists. They work with your staff . . . appraise your equipment needs expertly. For the complete profit-building story of integrated equipment, call on your nearby A-C representative or write for Bulletin 25B-6280D. Allis-Chalmers, Milwaukee 1, Wis.

A-4083

MACHINE–MOTOR–DRIVE–CONTROL

THE CW SOLIDS HANDLING PUMP — Especially designed for coal washing. Handles up to 40% solids in suspension in slurries, tailings and sludges. Only five easily removed working parts. Capacities from 175 to 10,000 gpm; heads to 150 feet.

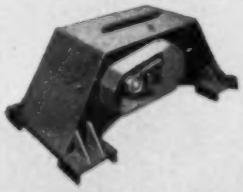


MOTORS — Allis-Chalmers builds a complete line of polyphase squirrel cage, wound rotor and synchronous motors with electrical and mechanical modifications to meet any application.

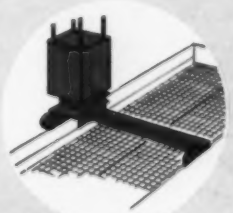
TEXROPE* DRIVE — *Vari-Pitch standard sheave. One sheave does the job of two or three. Speed range of 9% to 28% on drives of 1 to 300 hp. Two to ten grooves. Available in either motion or stationary control.

CONTROL — Includes full and reduced voltage starters for all type motors from fractional to 2500 hp, operating on voltage from 110 to 5000. Starters are available in general and special purpose enclosures.

TRANSFORMERS — Simple design, substantial construction and care in manufacture all contribute to excellent, long term "on-the-line" performance with minimum maintenance. A-C makes transformers of all types for indoor and outdoor installation.



CAR SHAKER — Unloads gondola cars in as little as two minutes. Simple vibrating mechanism is eccentric shaft mounted on large bearings and driven by a 15 hp motor and *Texrope* drive inside shaker body.



THERMO-DECK Heating Unit — Low voltage resistance heating of wire cloth eliminates troublesome blinding of moist fine coal. Can be installed on any A-C screen.

Allis-Chalmers is one of the few companies in the world that can equip your plant with the basic machinery plus power, electrical and control equipment needed to operate it — *integrated equipment from a single source backed by complete responsibility.*

ALLIS-CHALMERS Builds Equipment for Coal Progress

You See BIRDS* Like These In All the Best Places**

*Bird Filters for Dewatering Fine Coal

**Up-To-The-Minute Preparation Plants — the two just naturally go together

BIRD COAL FILTERS HAVE WHAT IT TAKES

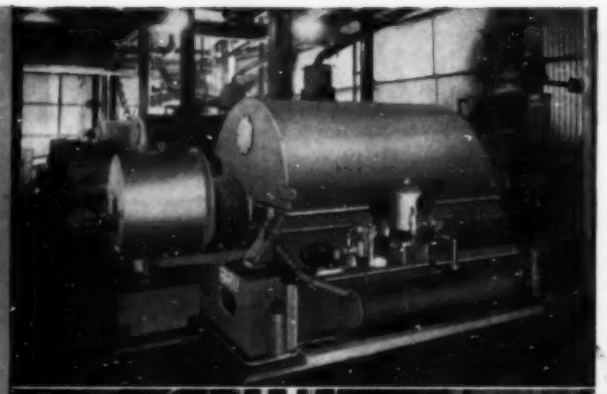
capacity — up to a ton or more of ¼ x 0 coal a minute

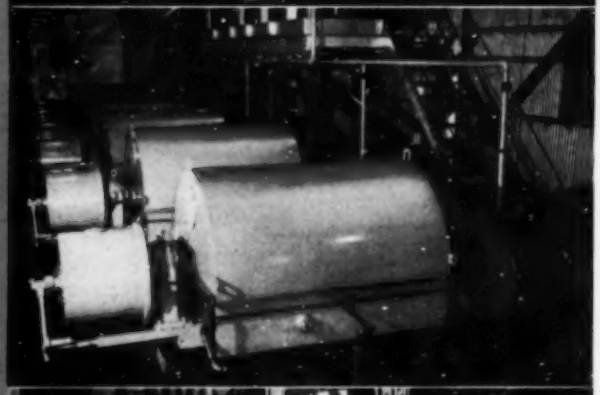
adaptability — handles feed slurries containing as little as 30% coal or even less, and 20% or more minus 200 mesh fines

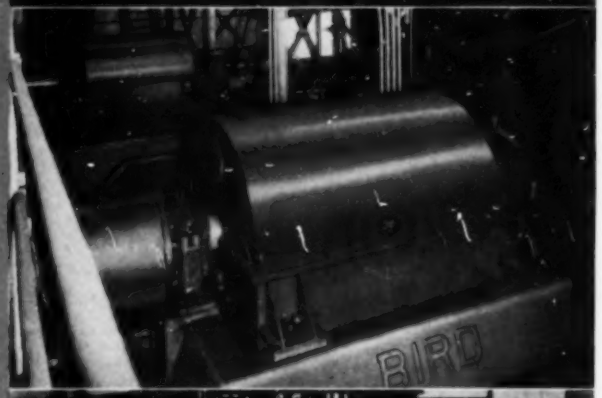
uniform dryness — with the Bird Filter those ultra fine, high ash slimes are removed without loss of prepared coal. This alone may reduce moisture content as much as 50%

low cost — Birds do the job for less than seven cents per ton, counting power, labor, amortization and maintenance. No expensive auxiliary equipment is required.

Get the facts and figures on what the Bird Coal Filter can do for you







BIRD MACHINE COMPANY

SOUTH WALPOLE • MASSACHUSETTS

Coal Age

JULY • 1953

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THIS MONTH . . . AND NEXT

THIS MONTH'S LEAD-OFF FEATURE beginning on p 66 is the third special article on practical methods of cutting mining costs published so far this year. Others will appear at regular intervals. Now in preparation and scheduled for September *Coal Age* is a chapter-and-verse analysis of today's stripping methods. Special Reports highlighting cost-cutting steps in face operations, haulage, continuous mining, power, preparation, etc., will follow along.

Primary purpose of these special studies is to provide *Coal Age's* readers with a comprehensive, useful guide to current practices and thinking of top operating men throughout the country. It is obvious that today an abandoned property is the only mine without cost problems. Ideas and more ideas, generated, adapted and applied with cost reduction in mind, are the only answer.

If you're a regular reader of *Coal Age*, you'll know that these reports are an extra bonus. You've already realized that practically every article in *Coal Age* deals with methods of lowering operating costs, either directly on the ever-present problem of more output per man, or indirectly with information on auxiliary services and necessary mining operations.

Take a look at this issue, for example. The aluminum shaker (p 78), a new slope-sinking machine (p 81), the unusual features of the new Williams preparation plant (p 92), continuous mining of pillars (p 98), real progress in safety (p 100), are only a few of the useful, and, we hope, interesting ideas you'll find by leafing through this issue.

Next month's issue will be just as rewarding, we think. Many operating men tell us that *Coal Age* is their most fertile source of new and varied ideas in deep-mine and stripping operation and preparation. To continue to merit such gratifying comments is *Coal Age's* basic editorial objective.

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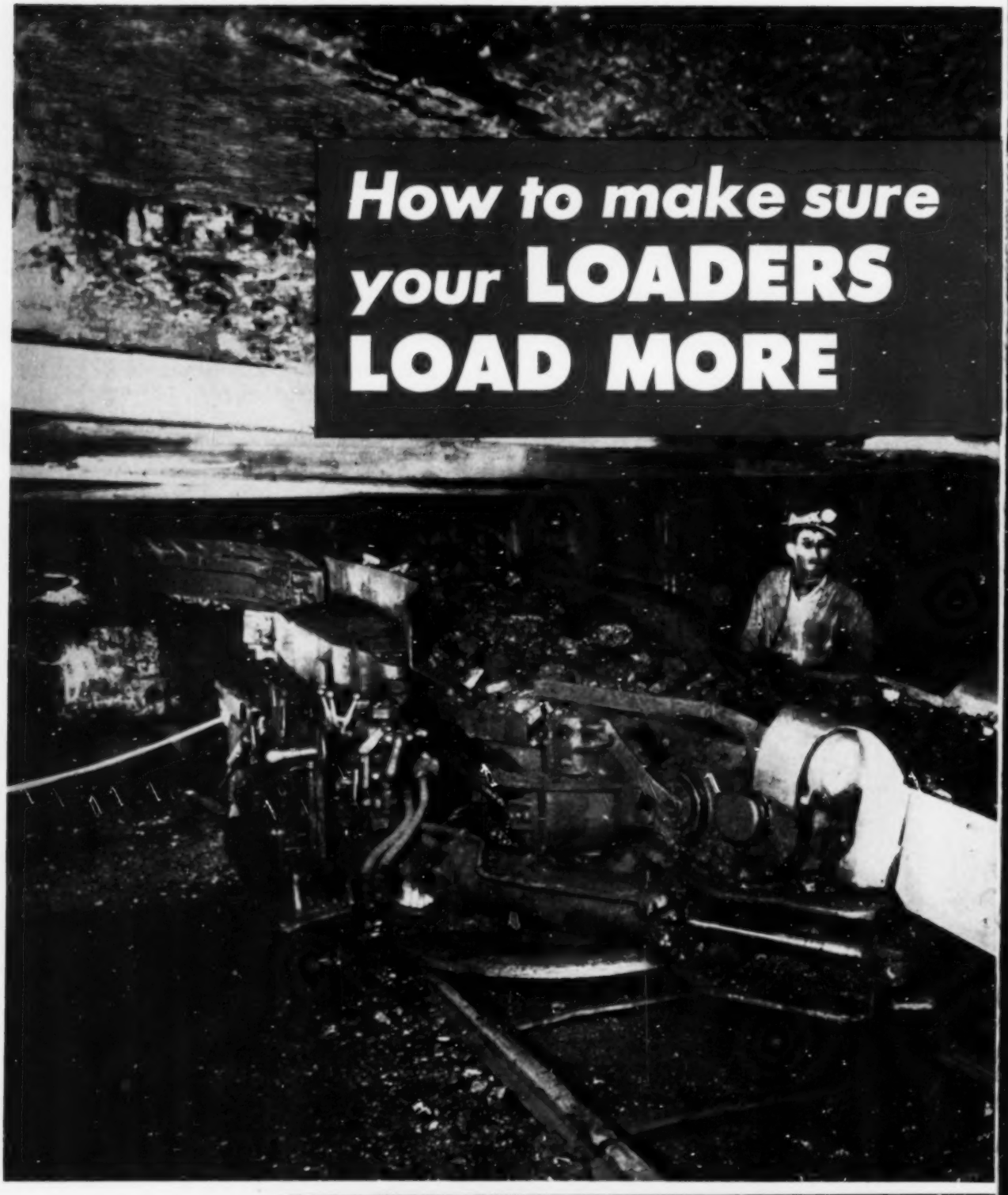


TEXACO

TEXACO

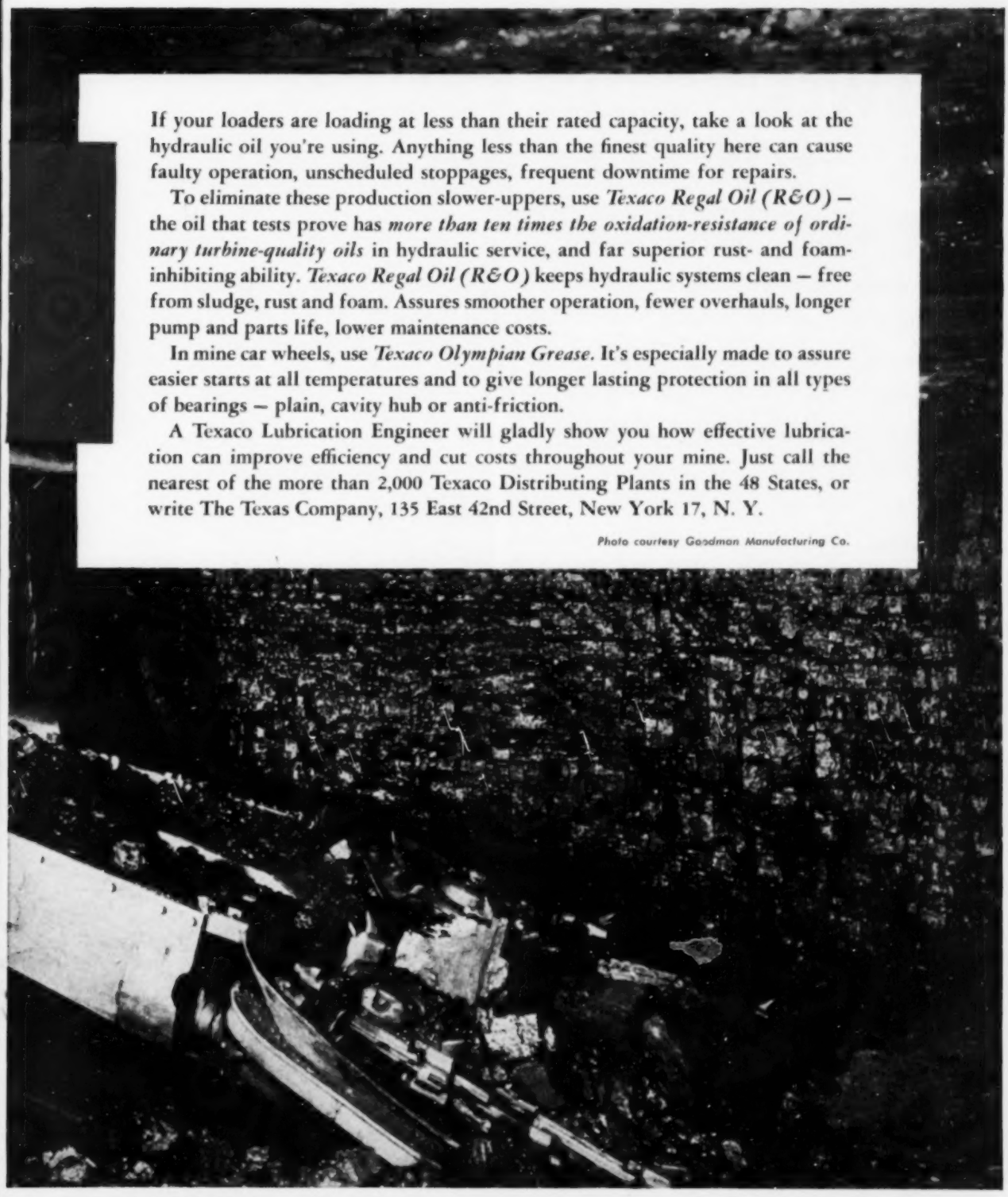
If your loaders are loading at less than their rated capacity, take a look at the hydraulic oil you're using. Anything less than the finest quality here can cause faulty operation, unscheduled stoppages, frequent downtime for repairs.

To eliminate these production slower-uppers, use *Texaco Regal Oil (R&O)* – the oil that tests prove has *more than ten times the oxidation-resistance of ordinary turbine-quality oils* in hydraulic service, and far superior rust- and foam-inhibiting ability. *Texaco Regal Oil (R&O)* keeps hydraulic systems clean – free from sludge, rust and foam. Assures smoother operation, fewer overhauls, longer pump and parts life, lower maintenance costs.

In mine car wheels, use *Texaco Olympian Grease.* It's especially made to assure easier starts at all temperatures and to give longer lasting protection in all types of bearings – plain, cavity hub or anti-friction.

A Texaco Lubrication Engineer will gladly show you how effective lubrication can improve efficiency and cut costs throughout your mine. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Photo courtesy Goodman Manufacturing Co.



LUBRICANTS for the Coal Mining Industry

ANSWERING THE CALL FOR GREATER OUTPUT

It takes truly modern equipment to keep pace with today's stepped-up demands — and do it at an operating cost which insures fair and consistant profits. This line of Allis Chalmers equipment has been designed and built completely new since the war, with the kind of advanced engineering that delivers big-capacity performance at a minimum of maintenance costs. It is the line that's Designed For Your Job . . . Built To Take It . . . Easy To Operate . . . Easy To Service.

Flexible Excavators and Loaders. Front-mounted hydraulic shovels for all four models of Allis-Chalmers crawler tractors handle many excavating jobs, load trucks, other hauling units . . . feed hoppers and conveyers. Buckets range from one cubic yard on the HD-5G to four cubic yards on the HD-20G. Special rock buckets and rock forks are also available.

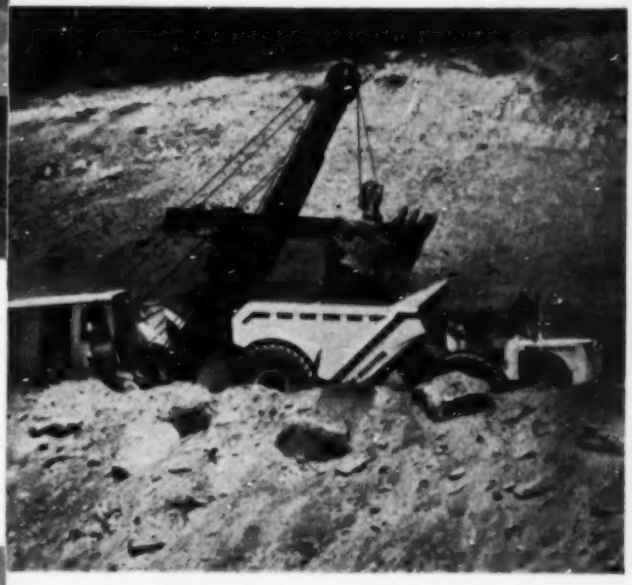
Shock Troops Of Production. Crawler tractors equipped with bulldozers handle countless stripping, excavating and other earth-moving jobs. Wide choice of bulldozers—straight or angled, cable or hydraulic — assure the right combination for maximum production on every job . . . enables users to strip overburden previously thought too deep to tackle profitably. Allis-Chalmers offers a choice of four crawler tractors to meet your needs from the 40 hp. HD-5 to the giant HD-20 with torque converter drive and 175 net engine hp.

Fast, Self-Hauling Scrapers. On stripping, hauling and dumping jobs, Allis-Chalmers Motor Scrapers move big yardage "on the double." These job-tested, job-proved machines have unusually high horsepower-to-yardage ratios, assuring top-average haul speeds even when loaded and on adverse grades. Their clean, open-top design also permits easy shovel loading. Other features, such as positive, forced ejection, high clearance, hydraulic power steering and simplified servicing add still further to production output. Model TS-200 has a 10 cu. yd. struck and 13 cu. yd. heaped capacity; TS-300 has a 14 cu. yd. struck and 18 cu. yd. heaped capacity.

Road Builders and Maintainers. Low-cost, tandem drive Model D easily handles maintenance as well as many construction jobs. With exclusive ROLL-AWAY moldboard, tubular frame and other high-production features, it gives big grader performance advantages at a fraction of the usual cost. For heavy grading and construction, four diesel powered models are available.

Your Allis-Chalmers dealer invites you to stop in and discuss your job requirements. He will be glad to help you select the right machine for your needs.

Tough, Speedy Hauling Units. Model TR-200 rear-dump Motor Wagon is built to take rock-shock. Double steel floor is reinforced with heavy oak plank. Front and sides are channel ribbed to provide rigidity. Clean interior, high 70-degree tilt plus constant wheel-base insures fast, safe and complete load ejection. Wagon body is interchangeable with TS-200 Scraper Body. Model TW-300 bottom-dump Motor Wagon is interchangeable with TS-300 Scraper Body.

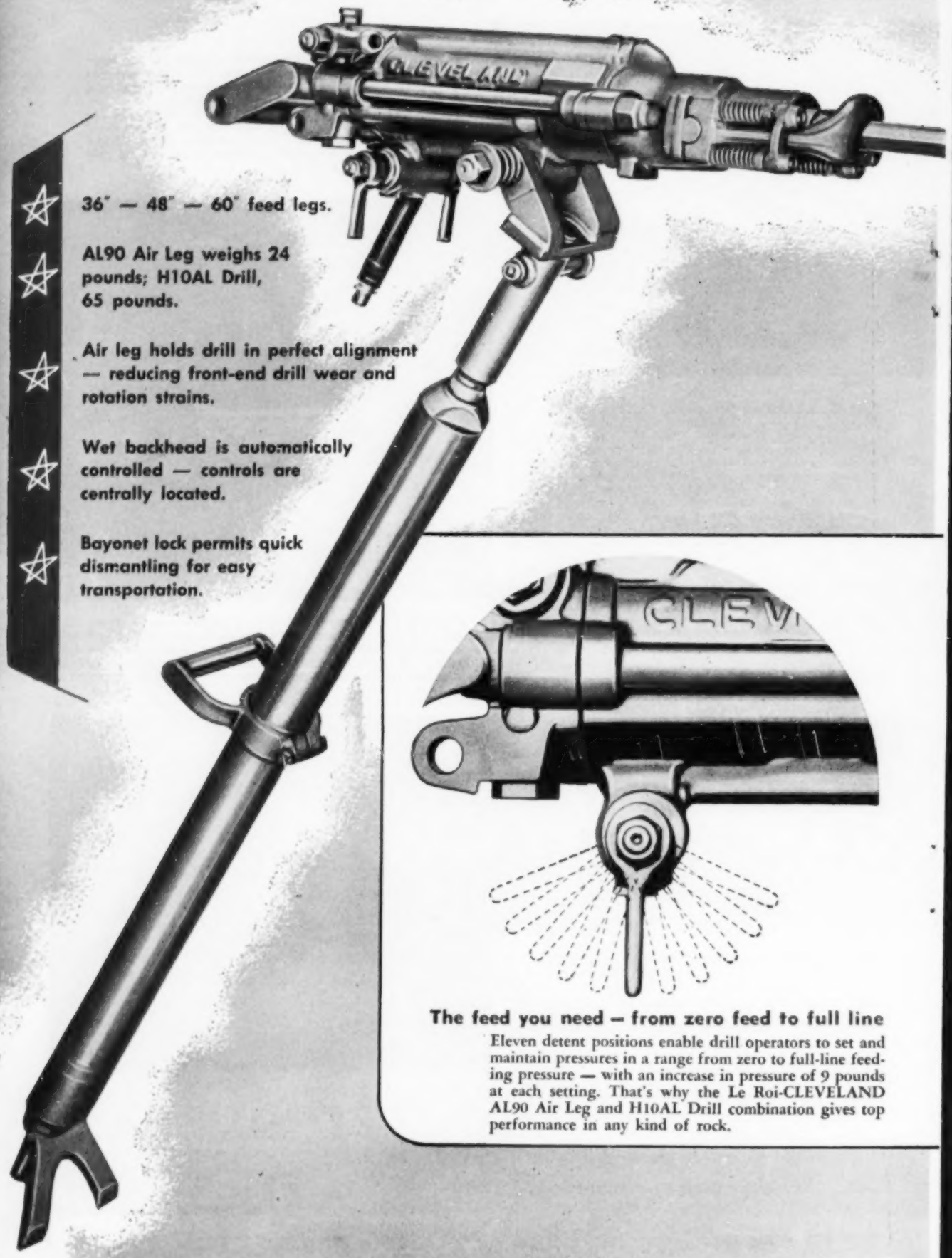


For Big Stripping Jobs. Allis-Chalmers tractors team up with pull-type scrapers to handle big stripping and stockpiling jobs. Your Allis-Chalmers dealer offers a choice of seven models to fit every tractor and every job. Struck capacities range from two to 18 cu. yd.

ALLIS-CHALMERS

TRACTOR DIVISION—MILWAUKEE 1, U. S. A.

ROLL-AWAY is an Allis-Chalmers trademark.



- 36" — 48" — 60" feed legs.
- AL90 Air Leg weighs 24 pounds; H10AL Drill, 65 pounds.
- Air leg holds drill in perfect alignment — reducing front-end drill wear and rotation strains.
- Wet backhead is automatically controlled — controls are centrally located.
- Bayonet lock permits quick dismantling for easy transportation.

The feed you need — from zero feed to full line

Eleven detent positions enable drill operators to set and maintain pressures in a range from zero to full-line feeding pressure — with an increase in pressure of 9 pounds at each setting. That's why the Le Roi-CLEVELAND AL90 Air Leg and H10AL Drill combination gives top performance in any kind of rock.

You're ahead 3 ways:

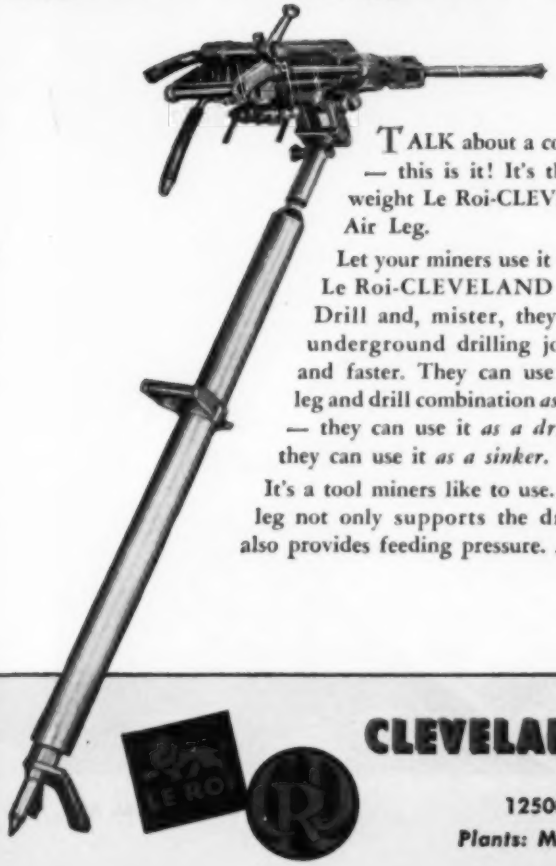
★1. Easier Drilling

★2. Greater Footage

★3. Lower Costs

— with LeRoi-CLEVELAND AL90 Air Leg and H10AL Drill

and exclusive feed control!



TALK about a cost-cutter — this is it! It's the lightweight Le Roi-CLEVELAND Air Leg.

Let your miners use it with the Le Roi-CLEVELAND H10AL Drill and, mister, they do any underground drilling job easier and faster. They can use this air leg and drill combination *as a stoper* — they can use it *as a drifter* — they can use it *as a sinker.*

It's a tool miners like to use. The air leg not only supports the drill, but also provides feeding pressure. And the leg absorbs any recoil. Miners' work is easier; they are less tired at end of the shift.

But that's not all! The feed control is built in — eliminates the necessity for a third hose and cumbersome "Y" connections. There's no feed-control bleed valve — the operator does not have to continually bleed-off air, to maintain suitable feeding pressure. He can change or advance the position of the leg easily and quickly.

Increase your footage — lower your drilling costs — ease the load on your men. Put the versatile Le Roi-CLEVELAND AL90 Air Leg and H10AL Drill to work for you. Write today for complete information.

RD-81

CLEVELAND ROCK DRILL DIVISION

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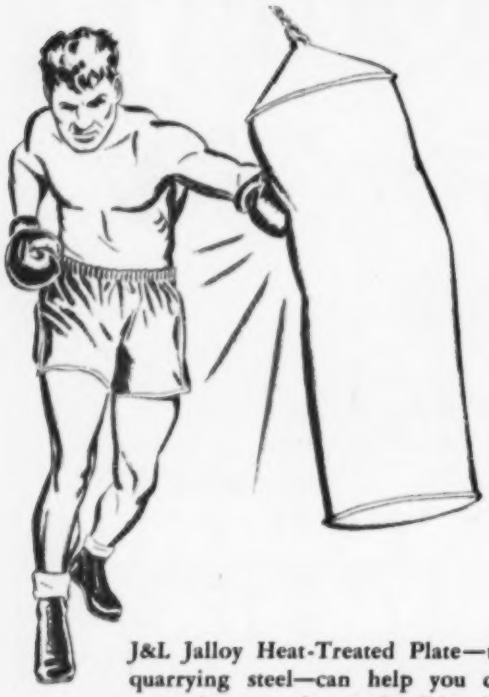
12500 Berea Road • Cleveland 11, Ohio

Plants: Milwaukee, Cleveland and Greenwich, Ohio

Your equipment gets



TOUGH

when you install

J&L JALLOY HEAT-TREATED PLATE

for impact and abrasion resistance on equipment like this

J&L Jalloy Heat-Treated Plate—the mining and quarrying steel—can help you cut maintenance costs, increase the service life of equipment that takes a real beating from severe impact and abrasion.

Here's why—heat-treated Jalloy was developed by J&L specifically for heavy duty applications such as those encountered in the mining and quarrying field. It's a heat-treated, fine-grain, manganese molybdenum steel with both yield strength and Brinell hardness *4 times* as great as mild steel. The result—J&L heat-treated Jalloy *lasts 4 times as long as mild steel* yet costs only twice as much.

It's easy to see why more and more progressive equipment owners have turned to J&L heat-treated Jalloy to do a dollar-saving job for them. If you're responsible for the economical operation of earth moving or handling equipment you'll want complete information on this modern mining and quarrying steel. Just fill in the coupon for a free copy of our Jalloy Booklet—"For Longer Wear . . . Less Repair."

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☐ Please send me a free copy of your booklet—"For Longer Wear . . . Less Repair."
☐ Please have your representative call.

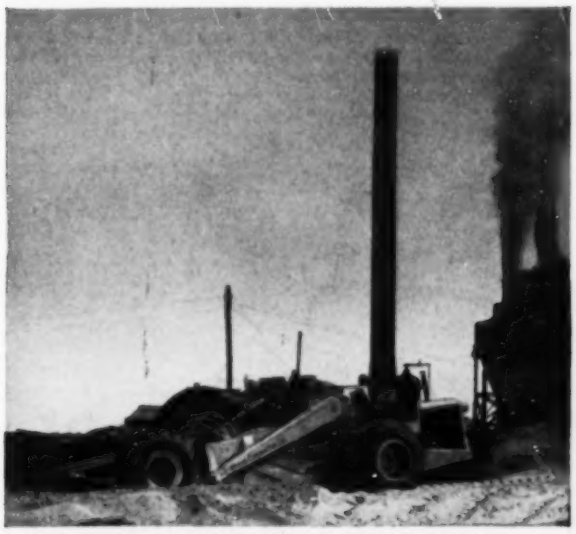
Name_____ Title_____

Company_____

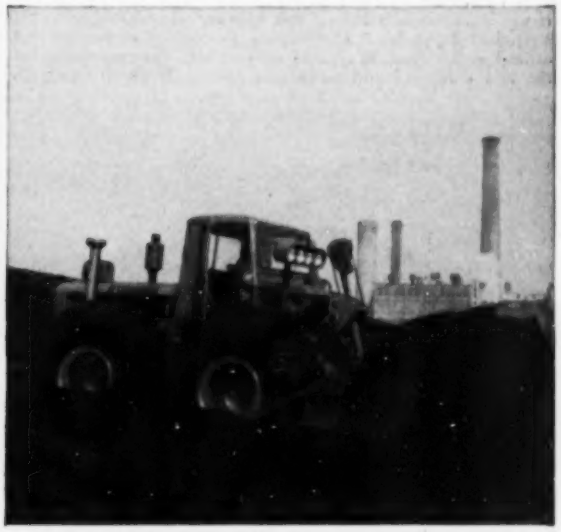
Address_____

LeTourneau pictures of the month . . .

40 TONS A LOAD —This 40-ton Tournarocker is one of Bagdad Copper Corp's haul units. The company, which mines copper at Bagdad, Ariz, also owns a 50-ton Tournarocker. Cycle of 4500 ft takes the 40-ton 'Rockers 11.2 min, despite 650 ft of 10% adverse grade and narrow haul roads. Cycle time includes 2 min to load from a 4-yd shovel, and ½ min to spot and dump. Disc-type 4-wheel air brakes let operator haul in 3rd gear along the narrow benches with complete confidence and safety.



100 YDS PER HR WINS JOB— On competitive demonstration at a Greenville (N.C.) asphalt plant, this D Tournapull stockpiled 20 loads of sand hourly. Each of two 91 hp crawlers, working same 450 ft haul, brought in only 6 loads hourly. All rigs self-loaded 5 bank yds per load. Based on results, Company President A. J. White bought the Tournapull.



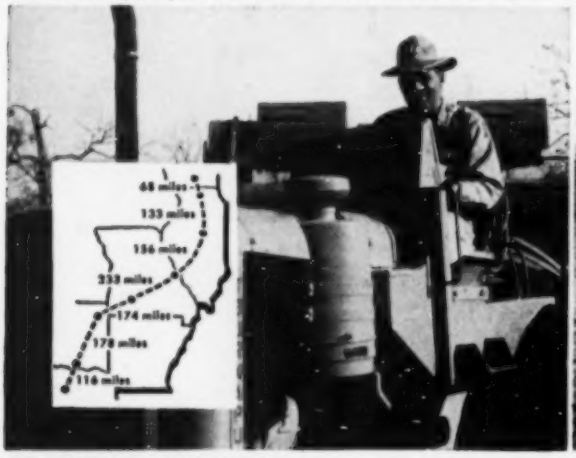
22% MORE COAL —Stockpiling coal for a power station in Rhode Island, Tournatractor dozed 16,850 cu ft (420 tons) of coal in 2 hrs . . . outproduced a crawler-tractor working under identical conditions by 77 tons (or 22%). Coal was moved 190 ft down a gradual slope, then over a steep 25-ft bank.

Continued on next right-hand page

LeTourneau pictures of the month (cont'd.) • • •

"TOUGHEST TUNNEL" — Halfway into a 3226-ft tunnel for B & O RR, Chicago Contractors Bates & Rogers struck an abandoned coal mine that made their routine job "one of the toughest RR tunnels ever built." Ten-yd Tournarockers, with 123¼-ft turn radius, were only haulers that could turn non-stop in the 31-ft passage. Trucks had to be turned on a skid plate.

OUTLASTS TRACKS, 4 TO 1 — This material may look like powder, but it's abrasive sand. It wears out crawler tracks in 4 to 6 months, yet C. E. Ulery, president of Asphalt Paving Inc., Jacksonville, Fla., estimates tires will last at least 2 to 3 years. Despite 100 lbs rolling resistance, Tournapull moved 9 loads (55 pay yds) hourly on 2700 ft cycles.



1058 MI FOR $60 — In a move which dramatically illustrated the roadability of a D Tournapull, Bill Kastner traveled 1058 miles from his home in Madison, Wis, to Arlington, Texas. It was D Tournapull's longest solo highway trip of the year. He started at 2 pm Jan 3 at Madison. By 6 pm that day, he had arrived at Rockford, Ill . . . 68 mi in 4 hrs. The second day he ran into a blizzard and made only 133 mi to Bloomington, Ill. His next stop, on Jan 5, was St. Louis, 156 mi further. On Jan 6 he drove 233 mi to Springfield, Mo . . . Jan 7, 174 mi to Pryor, Okla . . . Jan 8, 178 mi to Durant, Okla. At 1:30 pm Jan 9, Kastner arrived in Arlington, Tex. In 6 days, he had driven 1,058 mi (all by daylight) . . . used 180 gal. of fuel . . . average, 5.9 mi per gal. Total expenditure for fuel, lodging and food: $59.98. Saving over rail freight: $450.

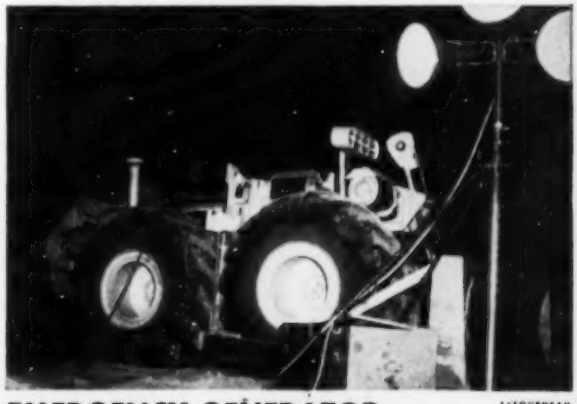
336 HR JOB IN 12 HRS—When a last-minute telescope breakdown threatened success of the US Navy and National Geographic Society's Solar Eclipse expedition to Khartoum, the Anglo-Egyptian Sudan Government came to the rescue. Its versatile 15-ton Tournacrane carefully hoisted and positioned the delicate 2-ton dish-assembly. The job, which would have taken about 336 man-hrs if done by hand, took only 12 man-hrs with the Tournacrane. Instead of missing the Eclipse they had traveled 7000 miles to see, astronomers not only saw the entire event, but had plenty of time to test and re-adjust settings.

Continued on next right-hand page

LeTourneau pictures of the month (cont'd) . . .

8 JOBS FOR JOHNS-MANVILLE — Even though the temperature often reaches 50° below zero, Canadian Johns-Manville works their Tournatractor 24 hrs a day, 6 days a week at their asbestos pit near Matheson, Ontario. One winter month, rig put 535 hrs in on 8 scattered jobs (other hrs went for job-to-job travel, lubrication, etc.). Of total time, unit spent 238 hrs dozing ore to crusher, cleaning around 4 shovels, and maintaining ore stockpile. Another 87 hrs went into tailings-dump maintenance. 62 hrs into waste-dump maintenance. Tournatractor worked 43 hrs towing compressors, wagon-drills, and other mine equipment. For 62 hrs, it plowed snow — in one typical 6¼-hr period, traveling 30 mi and opening 26 mi of road. For 43 hrs, it did such odd jobs as clearing rock and clay overburden, and helping shovels up steep grades. Its mechanical efficiency: 95%.

GOOD AS 4 MACHINES — "My D Roadster has replaced 3 trucks and one ¾-yard shovel on this job, and eliminated the wages of 3 hired men," says Sam Coffman of the Bowie Sand and Gravel Co. in Texas. His "D" strips the pit . . . selectively self-loads sand and gravel . . . stockpiles materials.



EMERGENCY GENERATOR — Another use for Tournatractor — as a portable generator for operating lights and power tools. For further information on any machine shown here, write to LeTourneau-Westinghouse Company, Peoria, Illinois.

Tournapull, Tournarocker, Tournacrane, Carryall—Trademark Reg. U.S. Pat. Off. Tournatractor—Trademark Pic. 397-M-w

no matter what your mine locomotives need

National

keeps them running

Complete rebuilding — motor overhauling — controller repairing — continuous-weld tire tread rebuilding — repair of mechanical damage — conversion of split frame motors to solid frame—replacement coils. Anything. Everything.

No matter what it takes to keep your mine locomotive running, National has the "know-how" and the equipment to do the job.

The National Electric Coil Company was born in the coal fields. Since 1917 National engineers have been specialists in your motive power problems. Two National plants — Harlan, Kentucky and Bluefield, West Virginia — are equipped and maintained especially for you.

Drop us a line for the name of your nearby National field engineer. He can help you solve any mine locomotive problem.

NATIONAL ELECTRIC COIL COMPANY

COLUMBUS 16, OHIO, U. S. A. TRADE MARK

ELECTRICAL ENGINEERS: MAKERS OF ELECTRICAL COILS AND INSULATION—REDESIGNING AND REPAIRING OF ROTATING ELECTRICAL MACHINES

The 6-SC SHUTTLE CAR
can cut your haulage costs

Can't beat it for speed and flexibility in medium-low coal

In its field, this newest-model Joy 6-SC Shuttle Car is the best assurance of low-cost, high-capacity haulage you can get—and here's why.

First, it's field-proved as the fastest and most dependable car in its class. The 6-SC makes time where it counts . . . in continuous operation from the face to the discharge point and back again.

Second, this year's model includes many improvements, modifications and additions that greatly increase its serviceability and all-around efficiency. Motors, gearing, wheel units, brakes and frame are all overcapacity, and it has interchangeable wheels and nonslip drive, plus such Joy-pioneered features as power steering and airplane-type disc brakes.

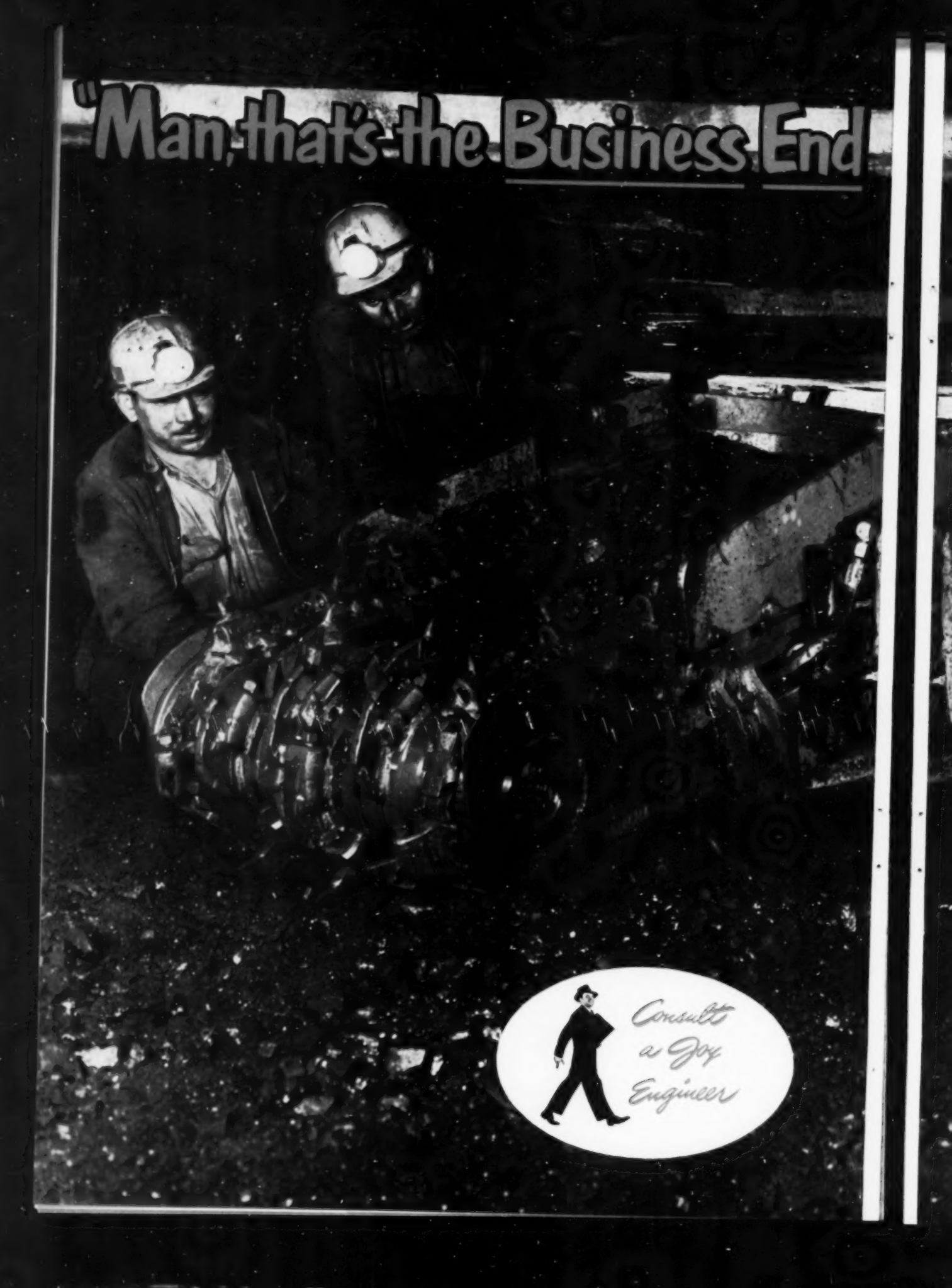
The Joy 6-SC has 4-wheel positive drive, 4-wheel hydraulic steering, and hydraulically adjustable elevating discharge. It is built in five heights from 29" to 38½" without sideboards, with a capacity range from 100 to 180 cu. ft.

● Other Joy Shuttle Cars include a type for every mining condition. ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

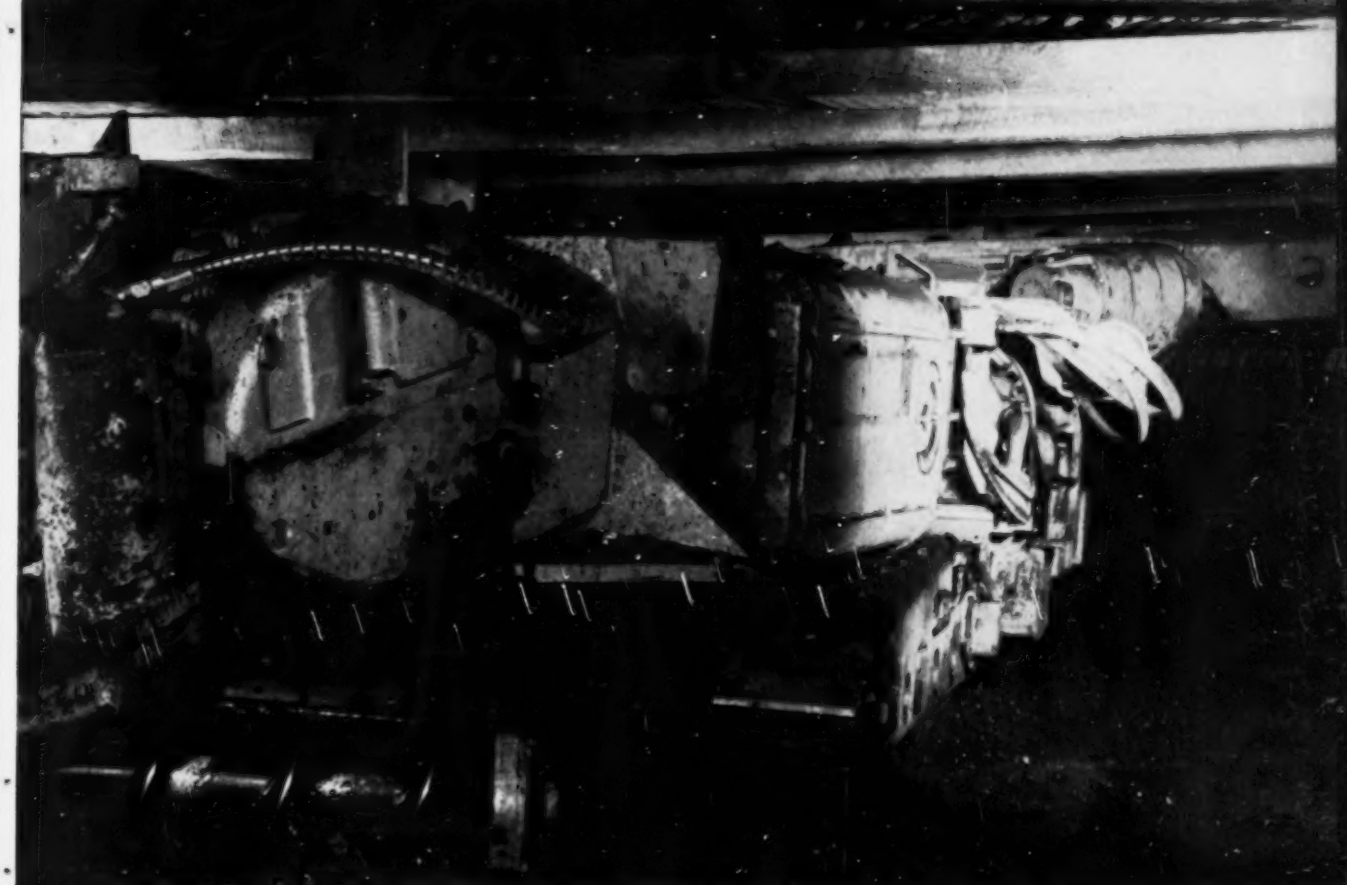
Consult a Joy Engineer

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT


"Man, that's the Business End
Consult a Joy Engineer

of the Lowest-Cost Mining Method there is!"



Depend on the CONTINUOUS MINER

- Low coal, thick seams or split seams . . . it makes no difference what your mining conditions are, there is a field-proved JCM machine built to suit them. *More than 200 in service or on order!*
- The Continuous Miner does everything you ask of it . . . develops entries, opens headings, drives up rooms, takes pillars.
- Gives you maximum recovery . . . over 80% total recovery is common, and some cases actually exceed 90%.
- Gives you favorable size consist and high production rates, at absolute rock-bottom cost per ton mined. Let us show you complete facts and figures.

Address ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

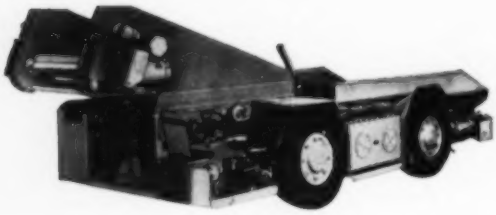
JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

CL 4004

Meet the Champ—The 1953 Model 10-SC!

It's the fastest round-trip SHUTTLE CAR built for high-production mining today.



The improved Joy 10-SC Shuttle Car is available as a Permissible or Non-Permissible unit, for net payload capacities up to 10 tons. It is built in 43", 48" or 54" heights (machine only) and may be equipped with 4", 6" or 8" sideboards. Tramming speed loaded is approximately 4½ m.p.h., and the unit is equipped with Joy-pioneered hydraulic cable reel, and hydraulically adjustable elevating discharge. Other special features include: 4-wheel drive, 4-wheel positive steering (hydraulic "power" type) and 4-wheel disc-type brakes, unaffected by dirt, coal dust, oil or water . . . improved arrangement of operator's controls . . . new "zone"-type lubrication . . . dependable Joy "Magnetax" controls, etc.

The Joy 10-SC Shuttle Car is famous for dependable, high-tonnage hauling under the toughest conditions, such as handling full loads of coal or rock in split-seam mining, etc. But we've improved it! The 1953-model 10-SC can get from the face to the discharge point and back again for another payload *faster than any other car in its class.* For some of the reasons why, check these features: traction motors of new design, with more reserve power . . . higher-speed, higher-powered conveyor discharge, cutting unloading time as much as half . . . over-capacity wheel units, brakes, gearing and frame for the least possible down-time and maintenance costs. ● There's actually nothing in the field like the 10-SC! Let us give you complete details. ***Joy Manufacturing Company, Oliver Bldg., Pittsburgh 22, Pa.*** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

Consult a Joy Engineer

W&D CL4595

JOY

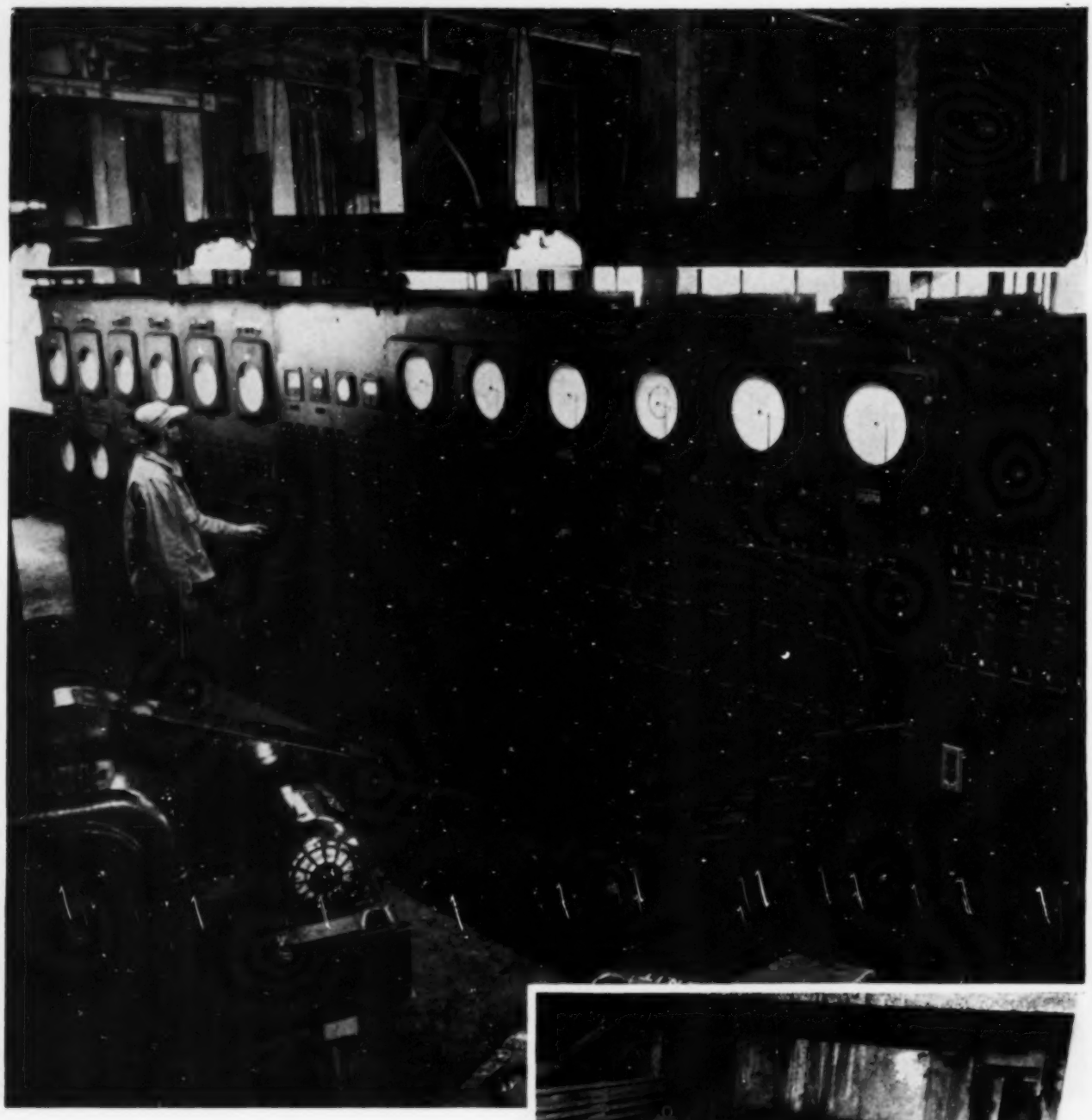
WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

Wire Rope at Work—Near Hazleton, Pa., lie rich seams of anthracite coal which in places are not far below the surface of the ground. The dragline excavator shown here, owned by A. E. Dick Contracting Co., is getting at the coal by stripping off overburden—the cover of earth that is about 120 ft in thickness at this particular point.

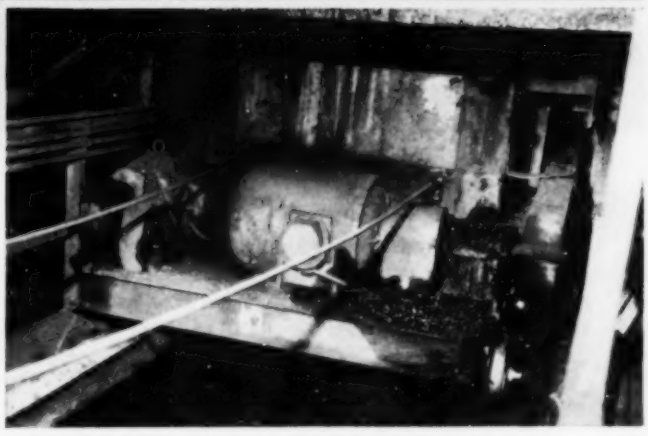
Using a 22-yd bucket, the excavator can scoop up thousands of cubic yards of dirt and rock per day. It works 'round the clock, with only minor interruptions. This mechanical mastodon is fitted throughout with Bethlehem Wire Rope, including twin draglines and hoist lines, visible in the picture as they handle the bucket. A typical assignment, the kind of rough, tough job entrusted to Bethlehem rope in every type of industry, wherever there is heavy lifting or hauling to be done.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

Mill depots and distributors all over the country stock Bethlehem rope for the following industries and numerous others:
MINING • CONSTRUCTION • PETROLEUM • EXCAVATING • QUARRYING • LOGGING • MANUFACTURING



Control boards like this one (at Robena) can be placed in out-of-the-way locations or in pressurized rooms. Sequence-motor-starting automatically starts equipment in proper order. Individual motor control is also provided for testing and special operations.



Coat of coal dust can't stop this Westinghouse Life-Line* motor because it has pre-lubricated sealed bearings. It's operating on a blending bin conveyor unit at Jones & Laughlin's Vesta plant.

*Trade Mark

Westinghouse centralized control runs world's 3 largest coal laundries

Automatic, centralized control—built by Westinghouse—makes the wheels go round in the world's three largest coal cleaning plants. Cooperation among owners, plant designers and Westinghouse produced, in each case, a man-saving, money-saving operation.

J&L's Vesta Plant—Fredericktown, Pa.
Completely Westinghouse equipped, this plant processes 2,000 tons per hour. It's high-grade metallurgical coal, uniformly blended for steel making. Automatic Westinghouse controls regulate the loading and unloading of blending bins. Conveyors feed, in rotation, three types of coal into different bin sections. Final batches contain the same careful mixture of all three. The setup has helped Vesta cut down the supervision and man power usually needed to coordinate this processing.

Hanna's Georgetown Plant—Cadiz, Ohio
Only five men, using Westinghouse centralized control, run this 1500-tons-per-hour operation. Conveyors carrying coal all over the plant are interlocked to prevent pile-ups. If a stoppage occurs on one section, all those behind it stop automatically. Seven Westinghouse power centers, combined with Westinghouse motors and gearmotors, deliver power economically—at only three kwhr per ton of coal. At the end of the line, one man loads five railroad cars simultaneously, an average of a full car every two minutes. Three electric eyes help weigh the loaded cars.

U. S. Steel's Robena Plant—Robena, Pa.
Turning out 650 tons per hour, this plant all but runs itself. Westinghouse supplied practically all the electrical apparatus. One man pushes a button, and complex related equipment starts automatically, in just the right order. There's no time lost by men following check charts and running all over the plant. If a piece of equipment becomes overloaded, a siren warns the operator.

Call Westinghouse on your next project
When you build a new plant, rebuild or add to your present operation, let us help. You'll get a plant that cleans more coal at lower cost. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-94000

YOU CAN BE SURE...IF IT'S Westinghouse

Vesta's four Westinghouse 1500-kva, 4160/480-volt type ASL transformers, with associated low-voltage switchgear and capacitors, are pictured at right. Controls are shown at the left.

Westinghouse Life-Line motors, driving these Deister tables at the Georgetown plant, never need greasing. Grease can't get out. Dirt can't get in. You can install them and forget about them.

Lower Maintenance is Just Plain Obvious with S-D "Automatics"

In these days of high material and labor costs, maintenance of equipment requires extremely serious consideration.

There are three plainly obvious reasons why your haulage maintenance cost will be greatly reduced with S-D Automatic Drop Bottom Cars.

1—FEWER CARS ARE NEEDED. With 50% less cars, maintenance cost goes down automatically. And, in addition, you drop off a locomotive or two. You use fewer cars because S-D Automatics dump faster, on-the-move. This means more trips, with less cars, per shift . . . and no waiting at the tipple—your surge bin takes the coal as fast as it comes out of the mine.

2—EASIER SERVICE ON S-D AUTOMATICS. Recent maintenance studies have clearly shown that shop repair time is almost double for other types of steel cars compared with drop bottom cars. At the same time, drop bottom cars haul over twice as many tons than either Rotary or End Dump cars. By its very nature of operation, S-D Automatic Drop Bottom cars just don't have to take the punishment required of other type cars.

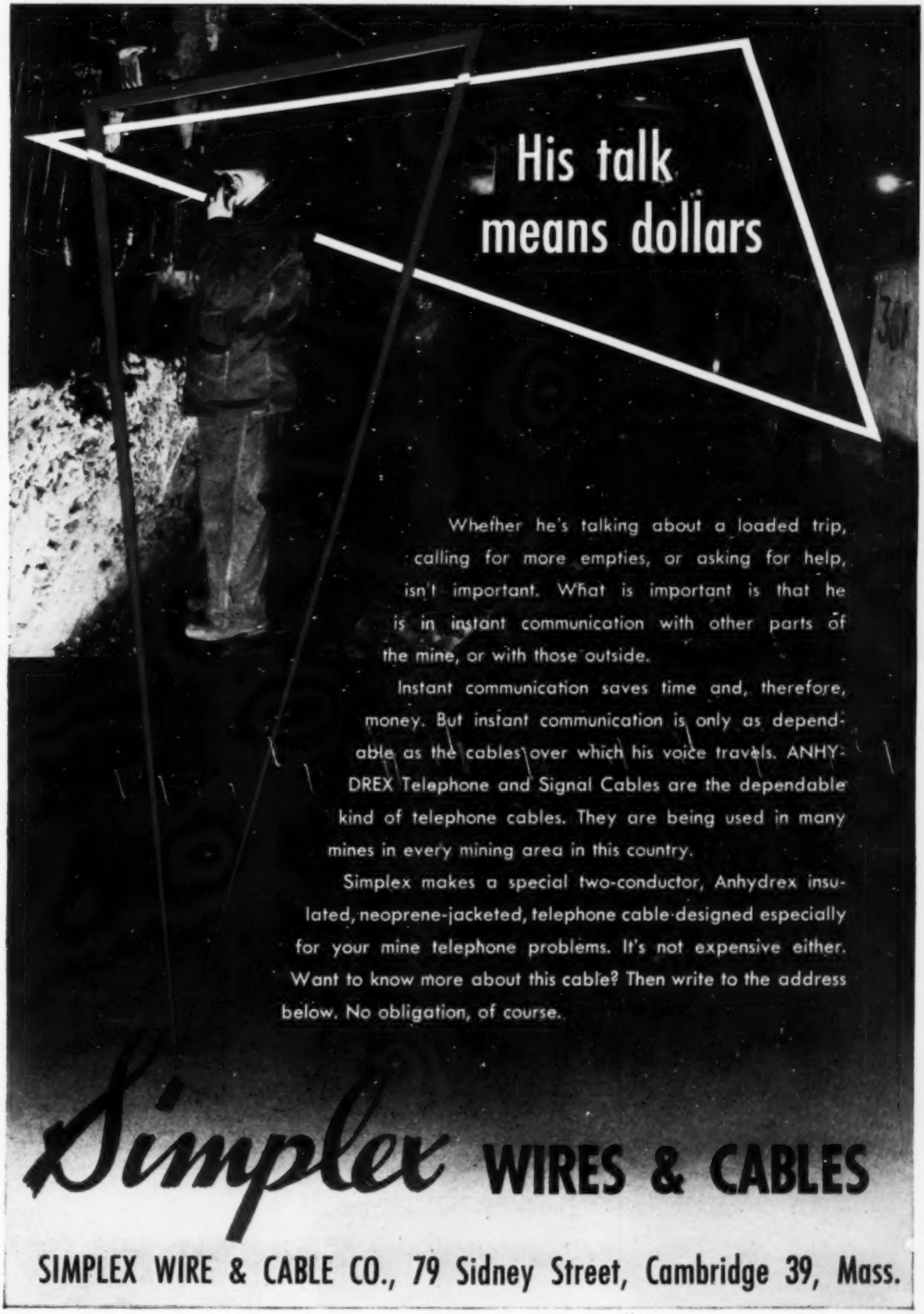
3—BETTER CONSTRUCTION. You know that skimpy fabrication is false economy. You will find that S-D Automatics have the extra welding . . . extra rivets and extra reinforcing where it should be . . . cars designed and built up to a service requirement for longer life and less maintenance!

Reducing your maintenance cost is just one of the ways S-D Automatics save you money. With them, and an adequate Surge Bin, you get an efficient, balanced operation between the mine and preparation plant, saving additional thousands of dollars annually. Let us help you make more money with S-D Automatics!

Red Jacket Coal Corporation's Southern Belle Mine in Mingo County, W. Va. is another typical example of how modern mines are making a major reduction in coal production costs by installing the S-D Automatic Haulage System. At Southern Belle this modern haulage system comprises three 15-ton locomotives, 250 S-D Automatics and a 450-ton capacity Surge Bin.

SANFORD-DAY IRON WORKS

KNOXVILLE, TENNESSEE

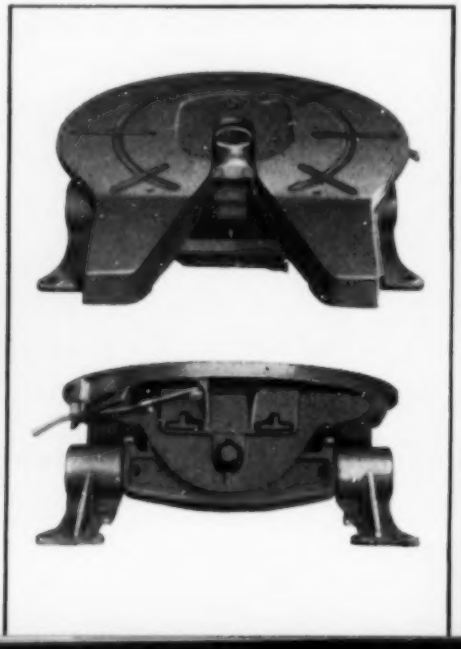

His talk
means dollars
Whether he's talking about a loaded trip, calling for more empties, or asking for help, isn't important. What is important is that he is in instant communication with other parts of the mine, or with those outside.
Instant communication saves time and, therefore, money. But instant communication is only as dependable as the cables over which his voice travels. ANHYDREX Telephone and Signal Cables are the dependable kind of telephone cables. They are being used in many mines in every mining area in this country.
Simplex makes a special two-conductor, Anhydrex insulated, neoprene-jacketed, telephone cable designed especially for your mine telephone problems. It's not expensive either. Want to know more about this cable? Then write to the address below. No obligation, of course.
Simplex WIRES & CABLES
SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Mass.

Marion shovel, loading a 34-ton coal payload into one of 23 Austin-Western trailers powered by Dart tractors. Scene is at Midland Electric Coal Corporation's strip mine near Farmington, Ill.

ASF Safety 5th Wheels have to be tough to stand up in this heavy-duty service, especially during wet weather when tractors are needed at each end of the semi to get it out of soft ground. Because ASF 5th Wheels are so easy to uncouple, in effect Midland has a *flexible pool* of load-carrying equipment and motive power, rather than 23 separate units. The result is fuller, more efficient use of available equipment.

Back and turn on a dime—In addition to quick interchange between motive power and load-carrying equipment, the tractor-trailer is highly maneuverable. ASF 5th Wheels are side-oscillating: even a full load can be safely and easily jackknifed for a short turning radius.

Heart of the semi—the ASF 5th Wheel—36" extra-heavy-duty ASF Safety 5th Wheel made for the rugged service and heavy loads found in off-highway work. Note the heavily reinforced plate; the massive "I" section center beam; the extra-strong mounting brackets.



He speaks through firsthand experience—M. R. Heckard, Superintendent of Equipment, has used ASF Safety 5th Wheels on all semi's for 11 years. He particularly likes the comparatively new 36" wheel shown at left; feels it will cut maintenance costs to a new low.

The Midland Electric Coal Corporation proves that your best investment for efficient tractor-trailer operation is an ASF Safety 5th Wheel . . .

"Best of all—they're easy to uncouple"

Ease of uncoupling is one of the big reasons why ASF Safety 5th Wheels are standard equipment on the fleet of semi's at Midland Electric Coal Corporation's strip mine near Farmington, Ill. M. R. "Marty" Heckard, Superintendent of Equipment, says:

"We use ASF 5th Wheels on all our semi's, and each wheel takes a real beating during the loading and hauling of a 34-ton payload around 30 times a day.

"One of the main reasons why we like these 5th Wheels is because they are easy to keep free of slack. We just add a shim usually once a year.

"Best of all, however, they are easy to uncouple in a matter of minutes. We can easily shop the tractor for maintenance without the trailer, or vice versa. Working on one at a time makes servicing easier, and we avoid tying up the whole semi."

Quick interchange between motive power and load-carrying equipment is a real asset in mining and quarry work. And there's no denying that you get it with a tractor-trailer. But a 5th wheel—or any hitching device—tends to defeat its purpose if it's hard to uncouple.

Easy uncoupling can save you time, trouble and expense, as it has in this modern strip mine operation. But, it's equally important to know that the ASF Wheel *only uncouples when you want it to uncouple.* This is no beefed-up highway wheel. It's made specially for heavy-duty off-highway service, from the "I" section center beam to the side-oscillating plate that absorbs the sidestrain of uneven roadway. Until a twist of the wrist releases the king-pin, it's built to *stay* coupled—come shocks, strains or high water!

Get the facts on the best 5th wheel investment you can make! See your nearest ASF Distributor, or write: American Steel Foundries, Automotive Division, 410 N. Michigan Avenue, Chicago 11, Ill.

remember this . . . about ASF safety 5th wheels

Largest king-pin bearing area of any 5th wheel . . . Stresses absorbed by a larger bearing area—larger than any other 5th wheel—means longer life for king-pin and jaws.

Shorter king-pin bending leverage . . . Jaws grip the king-pin at the top. The pin *stays straight*—and can't "spring" or disengage.

Side oscillation protects equipment . . . 1½° of free oscillation—plus 5½° controlled by rubber stabilizers—absorbs sidestrain of uneven roadway.

Heavy, cast alloy-steel construction . . . Plate is hinged on strong, rigid "I" beam with big 2" pin. Extra large contact area between plate and beam doubles rocker life. Both rocker and cast-steel bracket are bronze-bushed to cut wear to a minimum.

Easy to maintain in perfect operating condition . . . Wear is inevitable, but on ASF Wheels, it's easily counteracted simply by inserting one or more low-cost shims between buffer and housing front wall. Result? Like-new service, without expensive rebuilding!

A quick glance tells you the lock is LOCKED . . .

LOCKED—as quickly shown by the lever and safety latch—which can *only be in these positions* when the jaws are truly locked.

UNLOCKING—with an easy twist of the wrist. Simply move the safety latch up, and pull the lever forward.

UNLOCKED—ready for uncoupling; parts in lockset position. *Handle can only move back to locked position when the jaws are locked in the next coupling operation!*

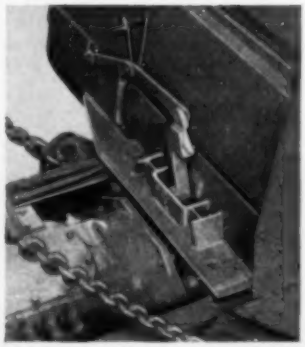
A 3,000-pound "compression-grip" saves your maintenance dollars . . .

COUPLING — as the king-pin enters the jaws, the jaws are forced back against the exclusive ASF rubber buffer block, building up compression.

COMPRESSING — 3000 pounds are built up before the lock clears the rear jaw, allowing lock to snap to locked position.

LOCKED—and the jaws *remain* under compression. The grip is like a vise; eliminates the slack and backlash that can cost you money in added 5th wheel and king-pin wear.

GRAVITY DUMP



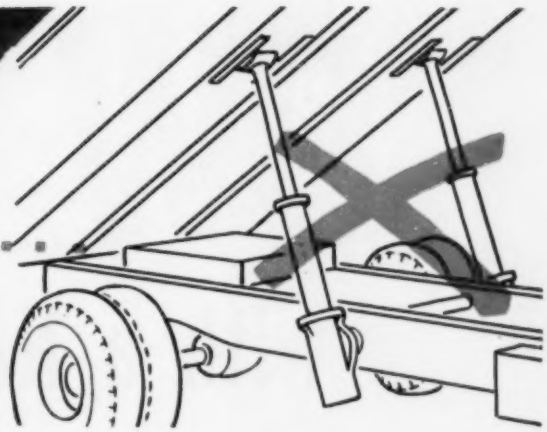
SIMPLE BODY RELEASE LEVER WORKS *INSTANTLY*

1 Body release lever is located in cab to left of steering wheel. Lever engages toggle linkage to latch hook on chassis . . .

2 Trip rod instantly releases latch hook from body latch seat on the tilting Dumptor body. Gravity dumps load instantly as . . .

3 Body rolls on heavy-duty rockers. Snub chains attached to big coil spring shock absorbers check body at 70-degree tilt.

eliminates body hoists. . . .



Koehring Dumptors®

have no slow-working body hoists. Operator trips the body-release lever . . . and gravity dumps the 6-yard load in just one second. It's as simple as that!

Saves 20 seconds every time you dump Because there is no waiting for slow-raising body hoists, one-second dumping saves 15 to 25 seconds dump-time on every cycle. This gives you more productive haul-time . . . earns an important increase in extra yards per hour.

Never balks . . . never wears out . . . There are no expensive hoist replacement parts, hoist maintenance or down time to eat into your profits. Koehring gravity dump is always instantaneous, trouble-free in all temperature extremes . . . never balks . . . never wears out.

No spring maintenance is another money-saving Dumptor advantage. There's just one big, double-coil chassis spring on steering axle, none on driving axle. Big shock-absorbing drive tires eliminate need for more springs . . . save spring maintenance time and replacement costs.

Check your body hoist and spring maintenance costs for a year. See how much you'll save when you haul with Koehring heavy-duty Dumptors. Get all the facts from your Koehring distributor soon . . . or write us for 28-page Dumptor catalog.

KOEHRING COMPANY

MILWAUKEE 16, WISCONSIN

Subsidiaries: PARSONS · KWIK-MIX · JOHNSON

K341

NOW...A Famous Family with a New Name!

ANNOUNCING

Only the name has changed . . . a change brought about by our desire to become more efficient . . . to bring all of our branches into a single unit and thereby free personnel for the more important job of serving our customers.

We hope the service we've rendered has been good . . . Now, under our new plan of operation, with a name that describes our business completely, we are confident Bearings, Inc. will deliver bearings just a little quicker and waiting for unusual sizes and types will not be as long.

Remember our new name . . . BUT CALL THE OLD NUMBER WHEN YOU NEED OUR SERVICES.

World's Largest Authorized Distributor of Industrial and Automotive Ball, Roller and Thrust Bearings, Transmission Units, Specialties and Accessories!

OHIO BALL BEARING DIVISION

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West Side Branch	3065 West 117th Street	CLearwater 1-6822
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CANTON 4	913 Ninth St., S.W.	Phone 4-6157
CINCINNATI 14	1417 Central Parkway	PArkway 8134
COLUMBUS 2	175 Cleveland Avenue	MAin 7635
DAYTON 2	608 South Jefferson Street	HEmlock 3731
ELYRIA	601 Cleveland Street	Phone 61841 or 61941
HAMILTON	706 East Avenue	Phone 4-8371
LIMA	142 S. Elizabeth at Spring St.	Phone 92660
MANSFIELD	137 West Sixth Street	Phone 4511-6
TOLEDO 2	1302 Washington Street	MAin 2275
YOUNGSTOWN 2	2007 South Avenue	Riverside 4-5013
ZANESVILLE	738 Linden Avenue	Phone 2-8437

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ERIE	812 Buffalo Road	Phone 46349
JOHNSTOWN	88 Poplar Street	Phone 9-1101
YORK	1285 E. Princess St.	Phone 7857

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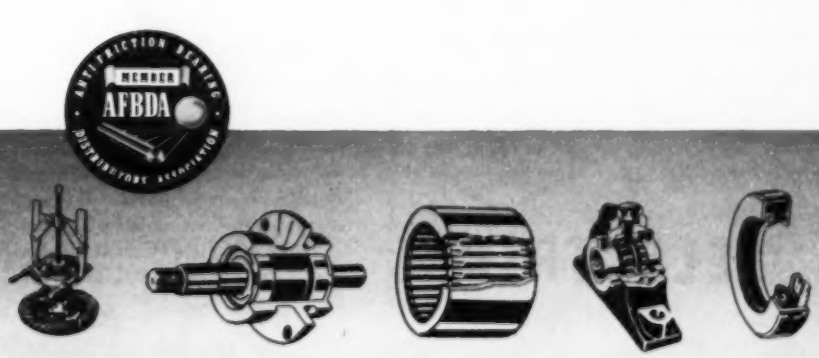
LAFAYETTE	406 North Street	Phone 2-2449
MUNCIE	301 N. Madison	Phone 3-1425 or 3-1426
TERRE HAUTE	1476 East Wabash Street	CRawford 2035



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BEARING SPECIALTIES

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United American (Babbitt)
Van Pelt Changeovers
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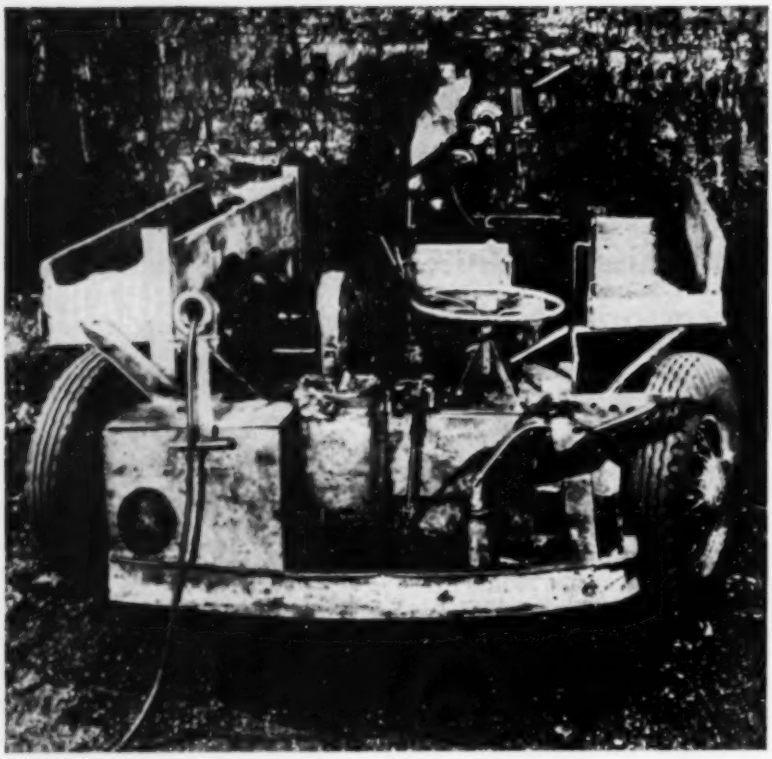


Use G-E GEOPRENE PORTABLE CABLE for the really tough jobs!

Built for the really tough jobs, G-E Geoprene portable cable is specifically recommended for use as trailing cable for cutters, loaders, and other portable mine equipment.

Its abrasion-resistant neoprene-base jacket is resistant to most oils, acids, alkalies, sunlight, and flame. For additional strength, a tough corded reinforcing mesh increases the cable's ability to withstand continual hauling and dragging, while the conductors themselves are rope-stranded for maximum flexibility.

In the full line of General Electric wires and cables you will find exactly the cable you need. This line includes G-E No. 1799 varnished-cambric-insulated cable, Super Coronol* cable, wire armored cable for borehole service, interlocked armor cable, aerial cable, mine telephone cable, Flamenol* control cable, and magnet wire.

Registered Trade-mark General Electric Company

You can put your confidence in—

1878 75 1953 YEARS OF ELECTRICAL PROGRESS

GENERAL ELECTRIC

WIRE AND CABLE IDEAS for Coal Mining

G-E Super Coronol preassembled aerial cable has many advantages over ordinary power cable. No field assembly is necessary . . . insulated conductors, binding strip, and messenger are completely assembled at the factory. Cable requires only a minimum clearance of right-of-way and can be quickly installed. Maintenance cost is low.

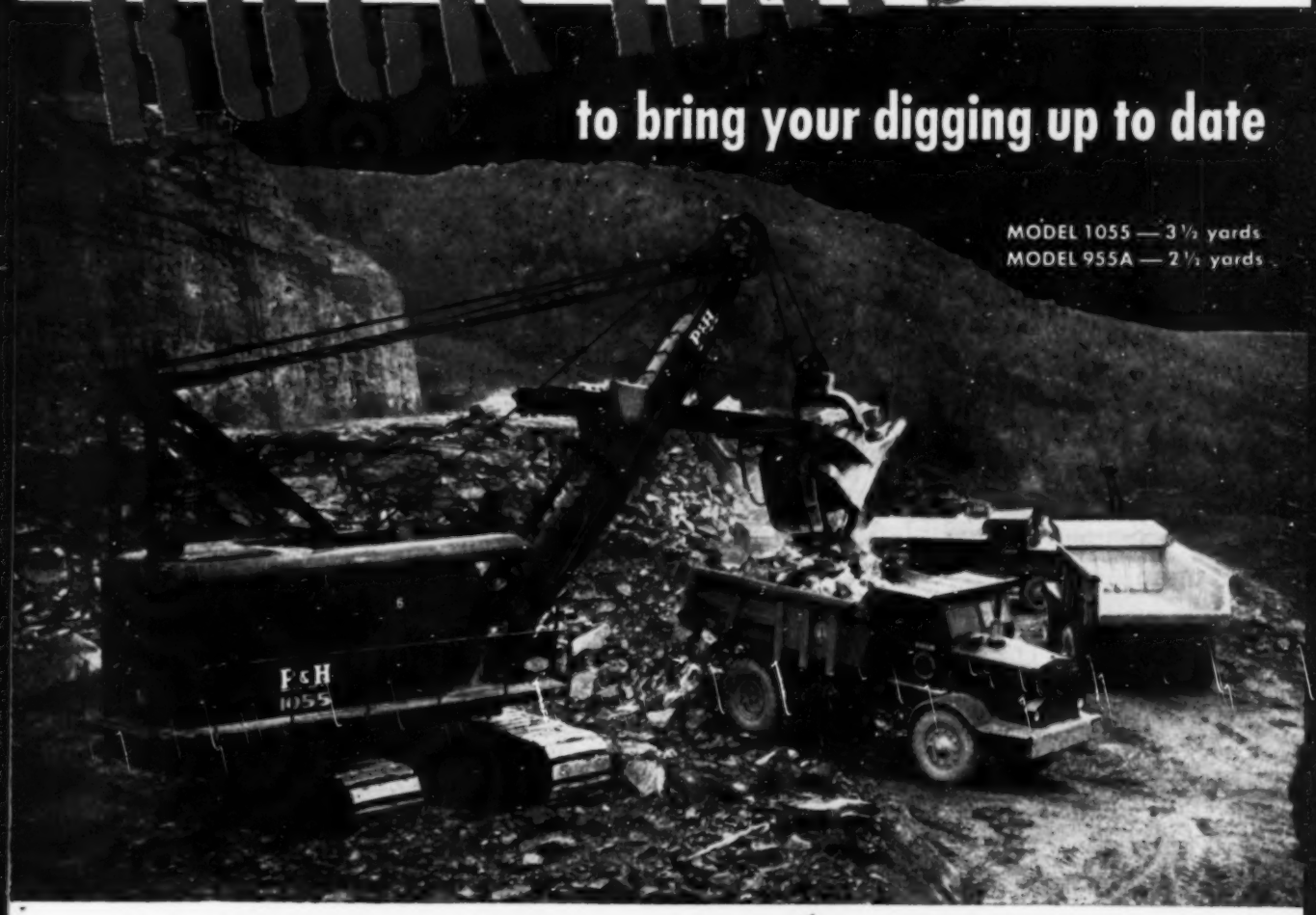
For the winding of motors, lifting-magnets, brake-coils, generators and starters, General Electric offers two types of magnet wire. For temperatures to 105 C, specify Formex*, Class A, an exceedingly flexible, tough, abrasion-resistant wire. Specify Deltabeston*, Class B, insulated with glass or asbestos, for temperatures to 125 C; Class H, with silicone-varnish impregnation, for temperatures to 180 C.

G-E shot firing cord is reliable and economical. Sturdy, flexible, highly resistant to moisture and mechanical injury, it has a red rubber jacket for easy identification.

The wide line of G-E wires and cables for the Mining Industry is described, with valuable application data, in this 24-page illustrated booklet. For your copy write to Section W70-714, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

ROCK RATED

to bring your digging up to date



You have the jump on costs when your new P&H takes over the tough digging jobs. Why? Because there's no other machine to match its performance. You have the speed — a 15% to 25% faster digging cycle — for bigger production. You have the all-welded strength to take shock loads that would K.O. less rugged machines. You have the stability to exert more power at the tooth point. That gives you added capacity.

If you're ready to cut your costs, these P&H's are ready to help you.

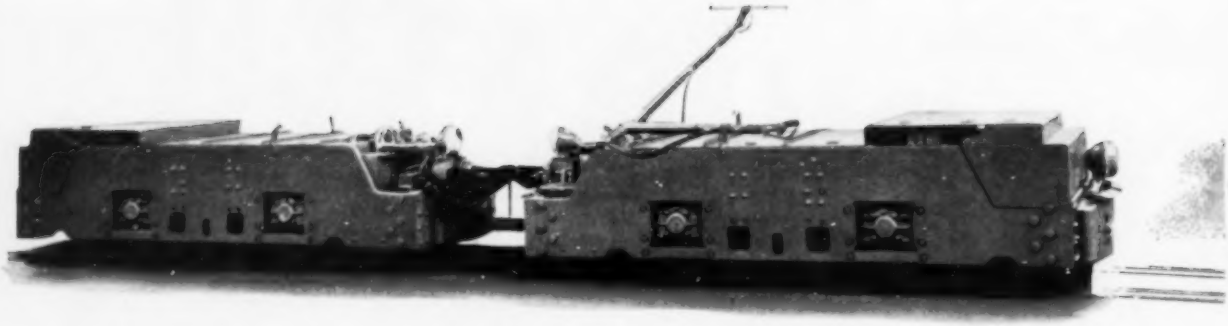
P&H MAGNETORQUE*
ELECTRIC SWING

the greatest shovel improvement in 20 years. It's smoother, faster, more dependable. It eliminates the old swing frictions with their constant headaches and replacement costs. Magnetorque lasts the life of your machine. You should know the facts about it!

**T.M. of Harnischfeger Corporation for electro-magnetic type coupling.*

P&H LARGE EXCAVATOR DIVISION
HARNISCHFEGER CORPORATION
MILWAUKEE 46, WISCONSIN

the P&H *Line*



For Heavier Duty Main Line Locomotives

Connect Your Single Units In *Tandem*

HERE'S HOW: Simply connect identical haulage locomotives in either permanent or separable Tandem units (see above). To do this you may require Controllers, Contactors, Power Brakes or other mechanisms to complete the job. Jeffrey can help you obtain adequate main line haulage for your mine. For an estimate of necessary details . . . call your nearest Jeffrey district office or direct an inquiry to Columbus. Do it today.

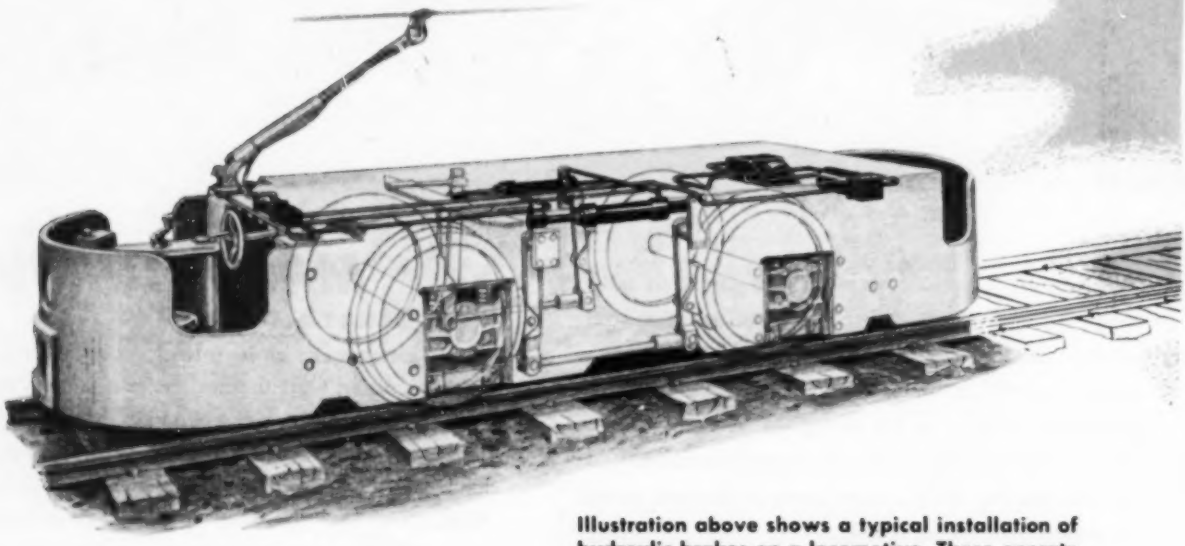
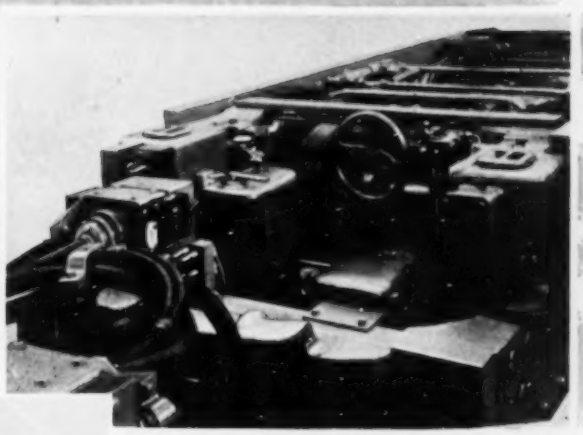
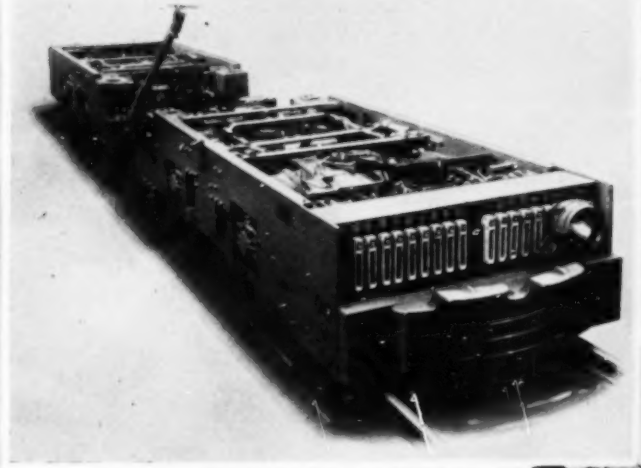


Illustration above shows a typical installation of hydraulic brakes on a locomotive. These operate on the same principle as the air brake but occupy about one-fourth the space. Installation is a simple matter.

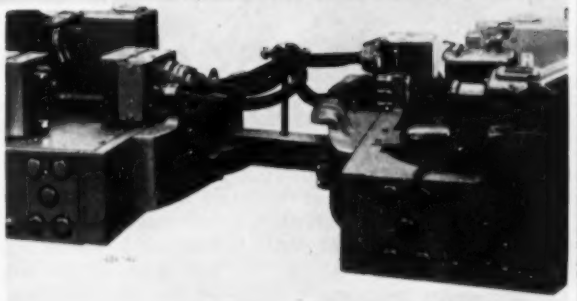
Left — A 20-ton permanent Tandem unit utilizing two 10-ton locomotives. This makes a very desirable main haulage unit.



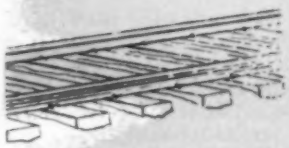
Right — A close-up view of the motorman deck in a tandem unit showing the control for the hydraulic brakes, the four-motor controller and installation of the electrical and hydraulic cross-connection. Air brakes are recommended, providing there is space available for installation of equipment.



Left — View of a permanent Tandem unit equipped with contactor control. Note bank of contactors in foreground.



Right — A close-up view of a typical permanent Tandem connection showing the drawbar, bumperettes, electrical and hydraulic brake cross-connections.



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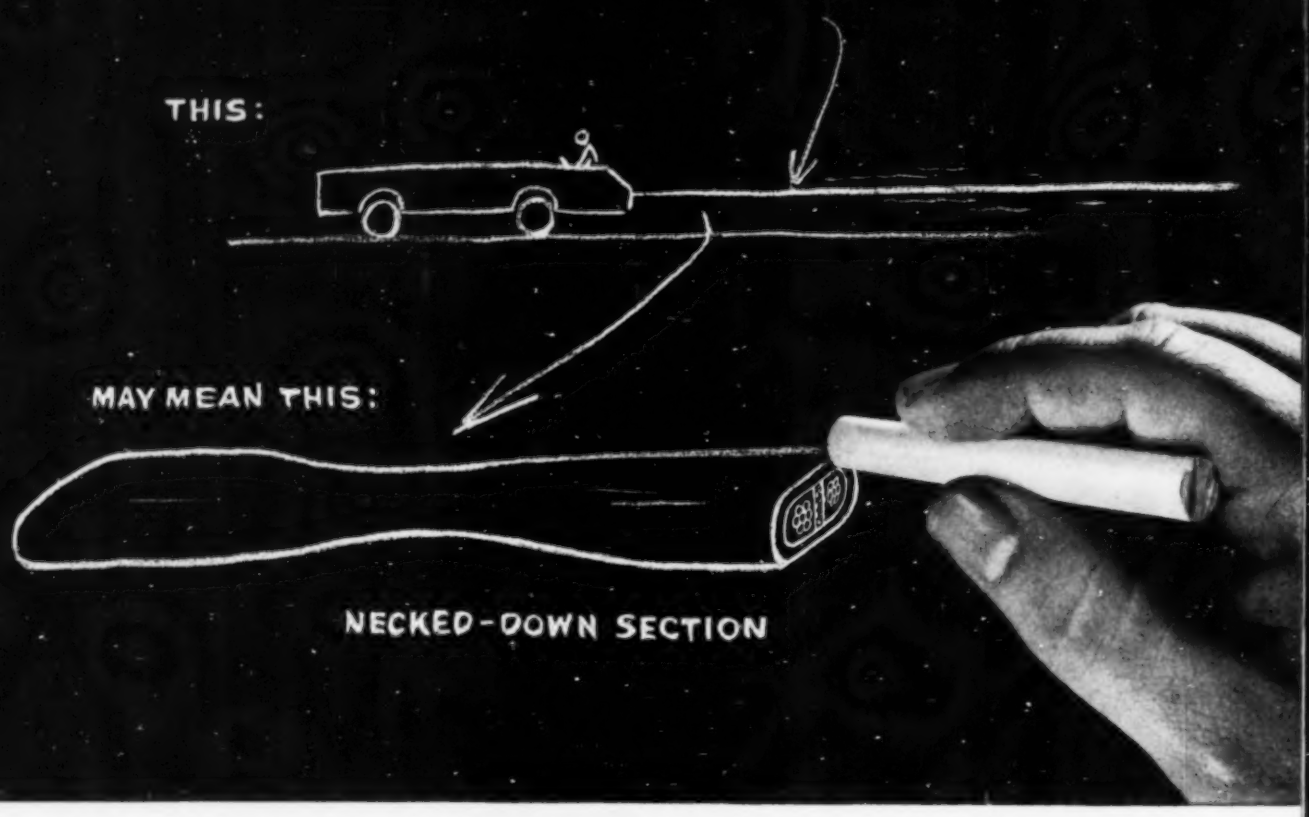
IF IT'S MINED, PROCESSED OR MOVED

. . .IT'S A JOB FOR JEFFREY!

HOW TO SPOT DAMAGE FROM TOO MUCH TENSION



. . . AND WHY ANACONDA'S NEW BALANCED DESIGN ADDS SAFETY, LONGER LIFE TO CABLE

Necked-down cable shows overstretching. Jacket and insulation become thin, easily punctured. Moisture penetration or a broken ground conductor may make the cable hazardous.

ANACONDA'S ANSWER: BALANCED DESIGN

Tension devices help; but aren't cure-alls. An added safeguard lies in the balanced design of Anaconda's new mining-machine cable. Stretchability of the ground has been increased. It will not break before the power conductors. A new neoprene jacket has higher compression-cutting resistance and tensile strength. In the insulation more strength and moisture resistance are obtained from a cold-rubber base . . . similar to that used by tire makers to mold a tougher tire. Stranding, too, has been redesigned to make the whole cable more flexible . . . at no greater cost. You get less trouble from tearing, cutting, gouging and abrasion caused by rib-pinching, runovers and dragging.

MUCH LONGER AVERAGE LIFE

In shuttle cars recently surveyed in 15 mines, ANACONDA Cables last 3 times as long as cables made only a few years ago. To learn why this is so, ask your nearest Anaconda Sales Office or Distributor for a sample section of this new cable. Examine it . . . take it apart. And remember that no ANACONDA Mine Cable has ever failed a U. S. Bureau of Mines flame test. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

ANACONDA®

TODAY'S HEADQUARTERS FOR MINE CABLE

FLAT TWIN CABLES FOR:
shuttle cars
continuous miners
loaders cutters
drill trucks

HI-VOLT CABLES FOR:
mine power

TYPE SH-D FOR:
shovels

TYPE SO FOR:
hand drills
remote control

TROLLEY WIRE
FEEDER CABLES
TELEPHONE WIRE
SHOT FIRE CORD
WELDING CABLES

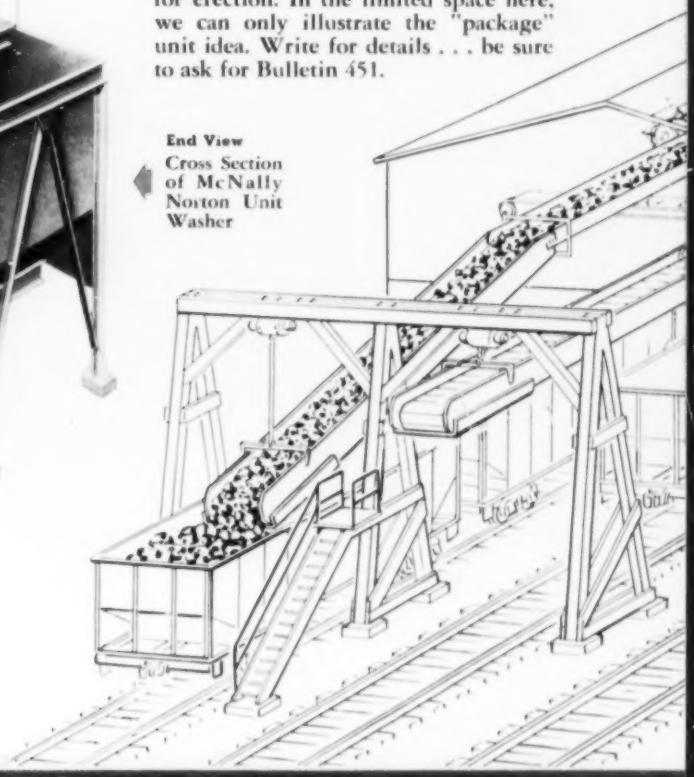
An important message to all small tonnage coal producers...

McNally Pittsburg now offers a Packaged Coal Cleaning Plant

America's only Baum-Type Unit Washer

The complete Washer Unit and the building addition to your plant to house the washer. The McNally Unit Washer handles coal from 5" to 0, in tonnages from 30 to 100 tph. Fully automatic, embodying the Baum Jig principle of separating coal from incombustible impurities. Unit delivered complete, ready for erection. In the limited space here, we can only illustrate the "package" unit idea. Write for details . . . be sure to ask for Bulletin 451.

End View
Cross Section of McNally Norton Unit Washer



McNALLY PITTSBURG
MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

Tell us your washing problems

we'll help you solve them

detach and mail this card

STATE YOUR PROBLEM HERE OR ON YOUR LETTERHEAD

Send us your recommendations on how we may use the McNally Norton Packaged Cleaning Plant.

We are operating on _____ seam.

We would like to wash _____ coal

at _____ tons per hour.

Name _____ Title _____

Company _____

City and State _____

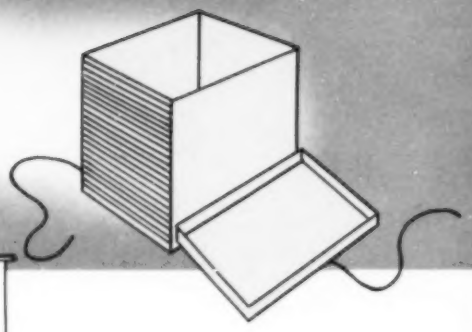
( ) Have Sales Engineer call for further consultation.

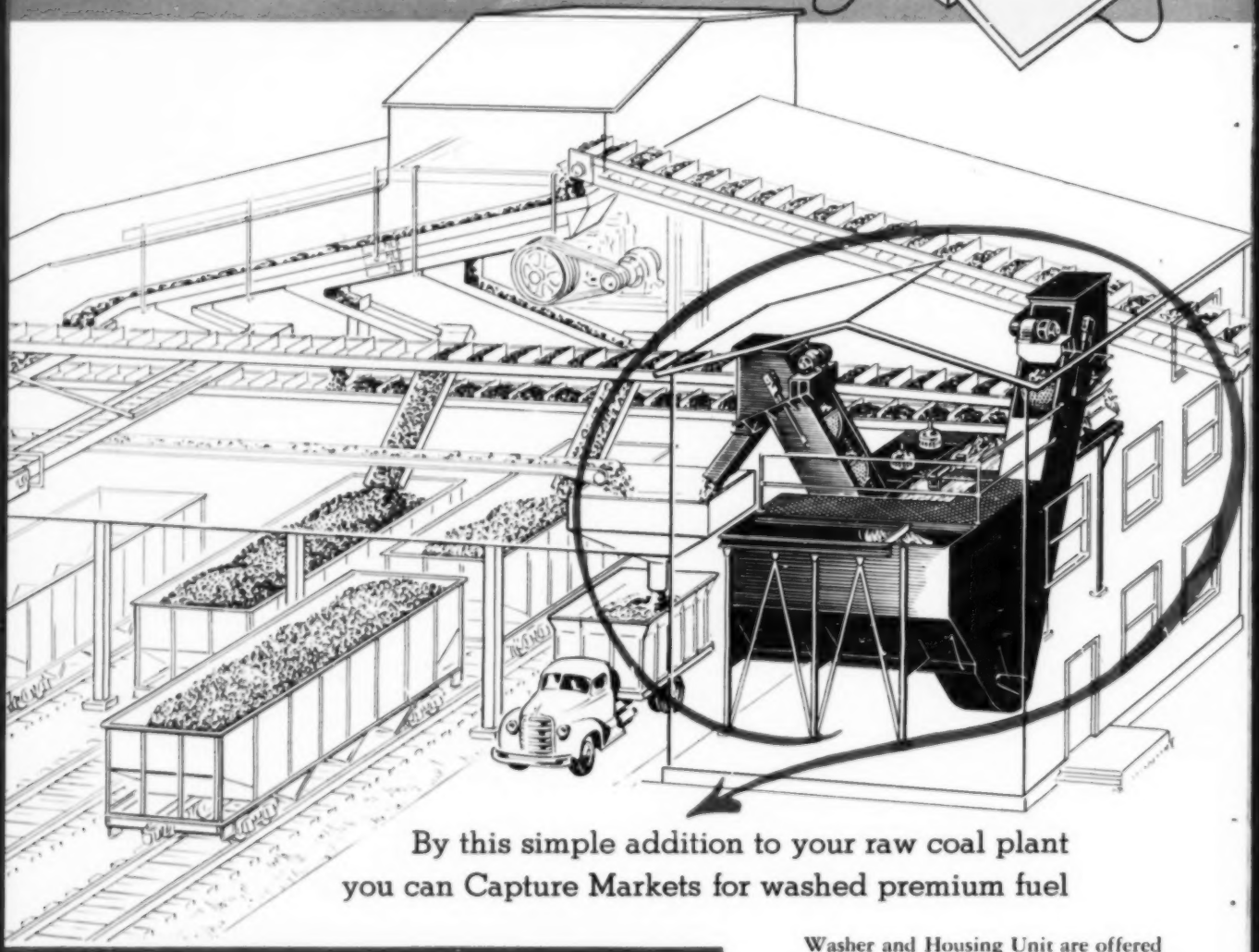
( ) Mail your Bulletin No. 451.

Here's what's in the Package..

Help For Smaller Tonnage Operators

who want to get in the market and stay there





By this simple addition to your raw coal plant you can Capture Markets for washed premium fuel

Washer and Housing Unit are offered in one "package." With it you add to your screening plant a washing section to up-grade your coal. With this equipment, you can meet your customers' most exacting specifications. You gain all the advantages of the same washing principles, the same rejection principles, as the big plants with washing requirements up to 2000 tph.

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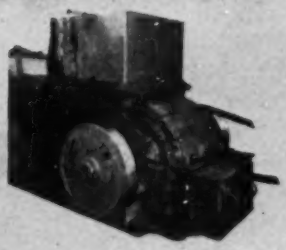
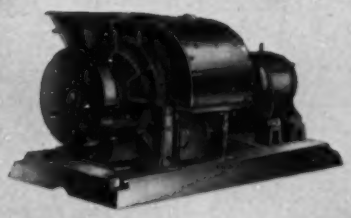
FOR HIGH TONNAGE CRUSHING . . .

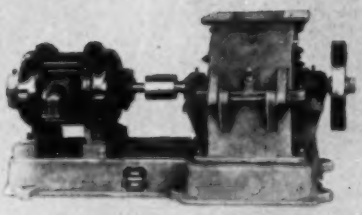


Heavy Duty 30-S. For Primary Crushing. Crushes ROM coal, rock, slate, sulphur balls and gob—high tonnage without oversize. Saves labor costs of pickers.

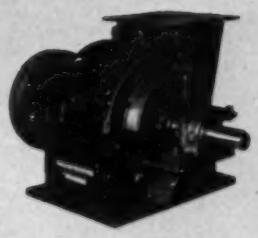


"S" Series. 9 sizes. Capacities up to 500 TPH. High tonnage with minimum fines. Well suited to power plants.

OR COAL SAMPLING . . .



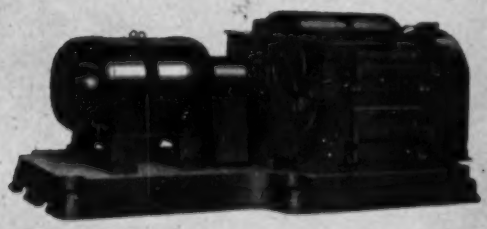
Laboratory Mill. 2 sizes. Capacities up to 2000 lbs./hr. Very efficient for coal sampling.



"13" Series. Three sizes. Capacity up to 6 TPH. For experimental runs, testing, and pilot plant operations.

THERE'S AN *American* ROLLING RING CRUSHER . . . FOR YOUR OPERATION!

"WC" Series. 4 sizes. Capacities up to 90 TPH. Available with drop cage. Compact, requires minimum headroom.



"AC" Series. 17 sizes. Capacities up to 800 TPH. Dual adjustability for easy size control. Drop cage for easy cleanout.

WRITE for details today. Describe your crushing needs.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 MACKLIND AVE.
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"Duplicate our order for Bethlehem Track Bolts?

Sure thing, Bill. Knew you'd like them."

BETHLEHEM STEEL

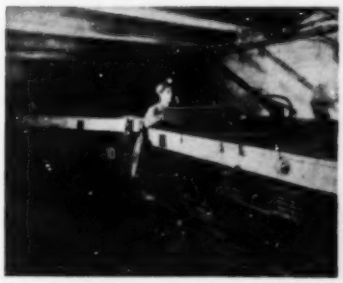
These Two M.S.A. Mine Communication Systems help you "TALK YOUR WAY" TO GREATER TONNAGE—SAFELY

THE M.S.A. MINEPHONE COMMUNICATION SYSTEM . . . answers mechanization's call for faster, safer HAULAGE OPERATIONS

Sending dispatcher's orders instantly and simultaneously to all motormen, who can reply or communicate with each other *while trips are in motion,* this modern underground communication system coordinates haulage movements with production demands . . . maintains smooth, continuous trip movements throughout the mine.

Messages, transmitted on an "open line" hook-up, keep the track clear for outgoing loaded trips and incoming empties. Keeping every trip on the move means less wear and tear on equipment; time is saved; injury is avoided.

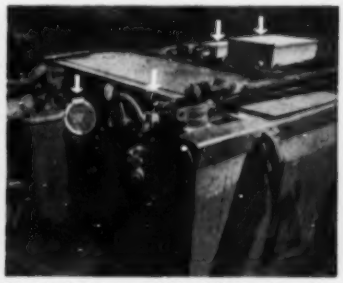
Write today for complete details on this vital production aid.



Motorman reports his position at cross-over.

Motorman, ready to go into mine, asks for right of way.

Trip unloader advises conditions at his station.

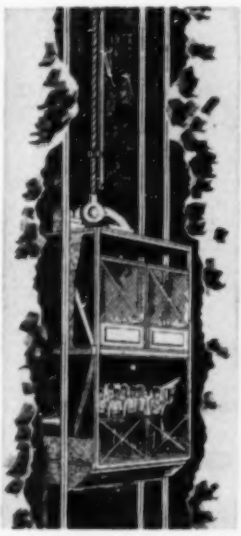


Typical compact MinePhone installation on top of locomotive.

THE M.S.A. HOISTPHONE COMMUNICATION SYSTEM . . . gives hoisting operations a lift . . . for greater production — safety

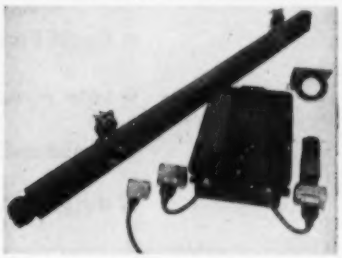
Here's the voice communication system that assures accurate, instant response between the hoisting engineer and cage. Whatever the job—load leveling—shaft repairs—shaft inspection trips—passenger transportation—the M.S.A. HoistPhone provides dependable, continuous voice communication at any level, and when cage is in motion.

The HoistPhone can be heard above noises of running equipment—is free of transmission noise and outside interference. Existing wiring, hoist cable and shaft frame can be utilized to carry the signal. It is simple to use—dependable in operation. Write for details on construction, flexibility, and design details.



HoistPhone permits positive control of the cage at any point in the shaft whether engaged in handling personnel, materials, repair or maintenance crews.

Hoist deck showing level indicator and M.S.A. HoistPhone. Voice control eliminates misunderstandings often caused by bell or horn signals.



Complete cage assembly showing transmitting and sending loop, transmitter-receiver, power supply box, microphone with control switch and speaker.

SAFETY EQUIPMENT HEADQUARTERS

When you have a safety problem, M.S.A. is at your service. Our job is to help you.

MINE SAFETY APPLIANCES COMPANY

Braddock, Thomas and Meade Streets, Pittsburgh 8, Pa.

At Your Service 69 Branch Offices in the United States and Mexico

MINE SAFETY APPLIANCES CO. OF CANADA, LIMITED

Toronto, Montreal, Calgary, Winnipeg, Vancouver, New Glasgow, N.S.

Cable Address "MINSAF" Pittsburgh

It's time to change a famous name

. . . to make it easier for you to identify and specify J&L's High Tensile Steels.

. . . to make it easier for you to obtain combinations of:

- **High Strength**
- **Good Formability**
- **Low Temperature Impacts**
- **Resistance to Corrosion**
- **Resistance to Abrasion**

J&L's new JALTEN series replaces the famous Otiscoloy line and may be selected in the following combinations of advantages:

Jalten No. 1—High strength, good formability and fabricating—improved low temperature impacts.

Jalten No. 2—High strength, moderate forming—improved resistance to atmospheric corrosion.

Jalten No. 3—High strength, moderate forming—improved resistance to abrasion.

Jalten*

replaces

OTISCOLOY

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH

This new Jalten book gives you complete information.

Send for your Copy...TODAY!

Features of this book show how Jalten can help you build better products:

- *Chemical Properties of Jalten*
- *Mechanical Properties of Jalten*
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JONES & LAUGHLIN STEEL CORPORATION
411 Liberty Avenue • Gateway Center • Pittsburgh 30, Pa.

Please send me a copy of "Jalten . . . the low alloy high strength steel."

Name _____

Company _____

Address _____

DU PONT "NITRAMON" produces excellent breakage on Wyoming stripping job

26,000-pound charge loaded 2 months before firing!

In the Kiewit, Wyoming, stripping operation of the Big Horn Coal Co., Du Pont Nitramon® blasting agent is used for maximum safety, good fragmentation and to permit loading holes as soon as they are drilled. For this shot, charges were loaded 2 months before firing . . . made possible with sealed cans in which "Nitramon" is packed.

Operator connects branch lines to "Primacord" trunk line. Shot consisted of 30 holes loaded with approximately 26,000 pounds of "Nitramon." Holes at this western stripping site averaged 90 feet in depth, with spacing up to 25 feet, and the overburden of sandstone and shale ranging from 30 to 50 feet.

Prior to blast, "Nitramon" increased the safety of every step of the operation. Unlike commercial explosives, this blasting agent cannot be detonated by ordinary blasting caps, fire, friction or sudden impact of falling objects. However, a "Nitramon" Primer (itself relatively insensitive) reliably detonates every charge.

After the shot. Photo shows good displacement and excellent fragmentation produced by "Nitramon" blast . . . two mighty good reasons why this blasting agent is so widely specified for coal stripping operations. Convenience of handling "Nitramon" is another welcome feature and it speeds up loading charges.

Du Pont "Nitramon" offers you efficiency, economy and, above all, increased *safety*. It's safer to handle—safer to load—safer to use—lives up to its name: "the safest blasting agent known"! For more information about this dependable product, talk with your Du Pont Explosives representative next time he visits your operation. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

DU PONT

"NITRAMON"

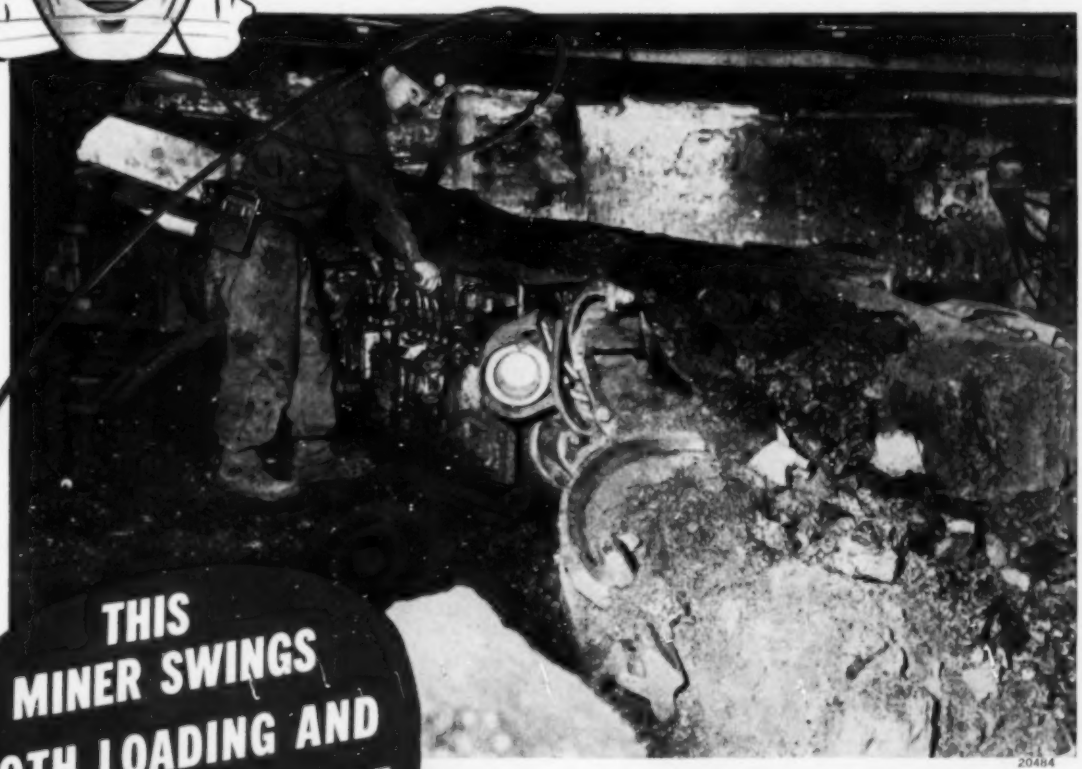
A Product of Du Pont Explosives Research

DU PONT

REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

As easily as he swings his head



THIS MINER SWINGS BOTH LOADING AND DISCHARGE ENDS OF A GOODMAN *Swing-motion* Loader

Stationed safely back from the coal face, this operator of a Goodman loader swings either the gathering head or the discharge end of the machine, through finger-tip hydraulic controls. Smooth, positive movements save time . . . range of swing reduces need for maneuvering in wide face room mining, permits high capacity loading when pulling pillars.

The *Swing* is to Goodman Loaders

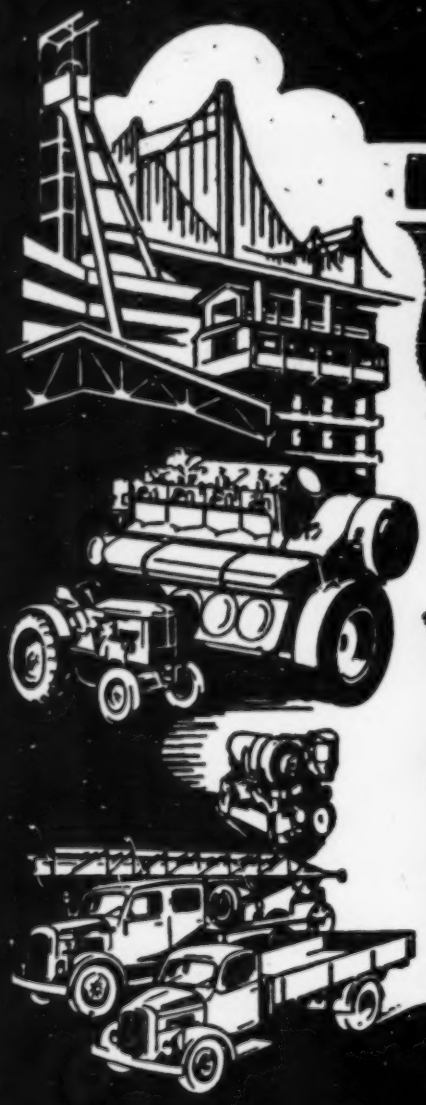
4 TYPES, 4 SIZES:
ALL SWING-MOTION

TYPE	TRAMMING HEIGHT
665	41½ inches
666	36½ inches
660	33 inches
865	26½ inches

***AVAILABLE NOW** . . . a Data Sheet covering the Goodman line of swing-motion loaders. A copy is yours for the asking.*

Goodman
MANUFACTURING COMPANY
4834 S. Halsted Street • Chicago 9, Illinois

Cutting Machines · Conveyors · Loaders · Shuttle Cars · Locomotives · Continuous Miners



HUMBOLDT

Mines Equipment, Mineral Dressing Plants, Crushing and Grinding Machinery, Cement Mill Outfit, Metallurgical Works, Coal Preparation Plants, Steel Constructions for Buildings and Bridges

Since 1856

DEUTZ

Otto, Gas, Diesel-Engines for Every Purpose of Two and Four-Stroke design. Output range 3 - 1500 H.P. Cooled by water or air. Diesel-powered tractors. Diesel locomotives. Gas producer plants

Since 1864

MAGIRUS

Trucks and busses driven by air-cooled DEUTZ Diesel engines. Vehicles for municipal services, fire ladders, fire engines, Fire fighting water trucks, Two-wheeled ladders, Fire fighting equipment.

Since 1864

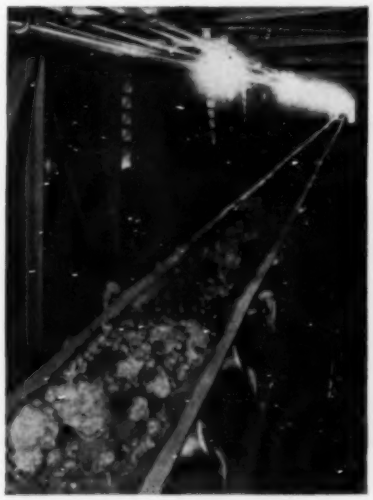
KLÖCKNER-HUMBOLDT-DEUTZ AG · KÖLN U. ULM

Send inquiries to either Köln, Germany or Ulm, Germany

For long-lived, heavy-duty conveyors . . .

IT'S TIMKEN... AND TIMKEN...

This Pioneer Washing Plant handles an average of 70 yards of sand and gravel an hour. Conveyor idlers are equipped with Timken bearings—one reason why the plant still has the same conveyor belt after 5 years' operation!



Here's a 337-foot Bartlett and Snow conveyor carrying iron ore sinter at the rate of 150 tons an hour. Timken bearings on conveyor idlers reduce friction, assure long life, reduce belt wear.

Tempered moulding sand—50 tons of it an hour—rides at the speed of 125 feet a minute on this Rex Idler Installation in a foundry. Conveyor belt is 24 inches wide. Idlers are equipped with Timken bearings.

AND TIMKEN AGAIN!

AND HERE ARE 6 BIG REASONS WHY:

1. **THOROUGHLY PROVED.** The Timken® bearing is the only tapered roller bearing proved by 15 years or more of service in heavy-duty conveyor installations using the popular dead shaft construction.

2. **EXTRA CAPACITY.** Line contact between rollers and races gives Timken bearings high load capacity. And by using Timken bearing sizes that are mass produced for the automotive industry, you get extra capacity bearings that actually cost you *less* than the smaller sizes you'd normally use.

3. **LONG-LIFE LUBRICATION.** Nor just lubricated for "life", but lubricated yearly, or as conditions require, to insure *long* life. Fresh lubricant ends any chance of gummy, sticky, jammed bearings.

4. **LONGER ROLLER AND BELT LIFE.** Less sliding and scuffing between idlers and belt.

5. **FRICTION MINIMIZED.** Timken bearings' true rolling motion and extremely smooth surface finish practically eliminate friction.

6. **MAINTENANCE REDUCED.** Long life and dependable performance of Timken tapered roller bearings cut maintenance to a minimum.

Remember "Timken" is not a bearing type. It is a trademark applying to bearings made by The Timken Roller Bearing Company. Always insist on Timken bearings in the conveyors you build or buy. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

Wherever the going's tough industry turns to

TIMKEN

TAPERED ROLLER BEARINGS

Typical applications of Timken bearings for conveyor idlers.

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST ◫ LOADS OR ANY COMBINATION ✳

Here's how ROCKMASTER® blasting increases explosives efficiency

You can see ROCKMASTER efficiency in these pictures, taken at the height of four different ROCKMASTER blasts. There is no flying rock, no geysering of explosive force. ROCKMASTER keeps the power of the blast confined, using all the explosives energy to produce maximum breakage with maximum efficiency.

When the blast is initiated at the point of maximum confinement, the explosive force follows the line of least resistance . . . directly into the burden. With ROCKMASTER millisecond blasting, the first initiation places the burden under maximum stress, producing lines of weakness throughout the burden. A split-second later, the next charge hits the stressed material with a shattering force that produces maximum breakage . . . maximum use of the explosive force. It is the "one-two punch" applied to blasting.

Ask your Atlas technical representative to show you the picture presentation of the ROCKMASTER story. See for yourself how the millisecond delay electric blasting caps teamed with the ROCKMASTER system of explosives choice can give you greater blasting efficiency through complete confinement of the blast.

ATLAS

ATLAS EXPLOSIVES

"Everything for Blasting"

ATLAS POWDER COMPANY
WILMINGTON 99, DELAWARE

Offices in principal cities

THESE REPOINTERS ARE

wear-conditioned

*U.S. Pat. No. 2,247,202

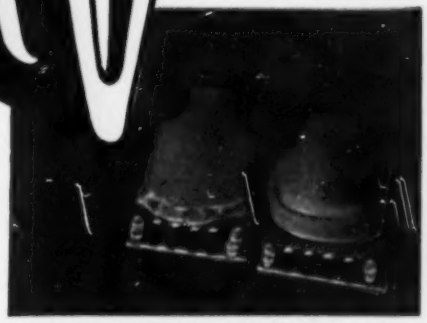
Because they are AMSCO "Wear-Sharp"* Repointers that stay sharper with use...

Service life plus! The combination of Amsco Manganese Steel and the hardness of AMSCOATING with Amsco Hardfacing electrodes—gives you a tooth that wears evenly and stays sharp longer.

Note that only certain grooves (shown in red at left) are Amscoated—the grooves on the outside and the one on each end. This is the area where ordinary teeth wear fastest. The hardened corners on the "Wear-Sharp" equalize wear along the entire cutting edge and eliminate rounded, blunted corners that cut digging speed and waste power.

Field reports indicate that "Wear-Sharp" repointers will give as high as six times the life of other teeth.

In these photographs at right of a typical case history, old repointers lasted from three to four days. Amsco "Wear-Sharp" repointers lasted 32 days—eight times the service life of the repointers previously used.



"Wear-Sharp" repointers installed on two dipper teeth showing condition of old teeth.

Notice the even wear on these teeth after 257 hours of use with "Wear-Sharp" repointers used. New "Wear-Sharps" are ready for installation.

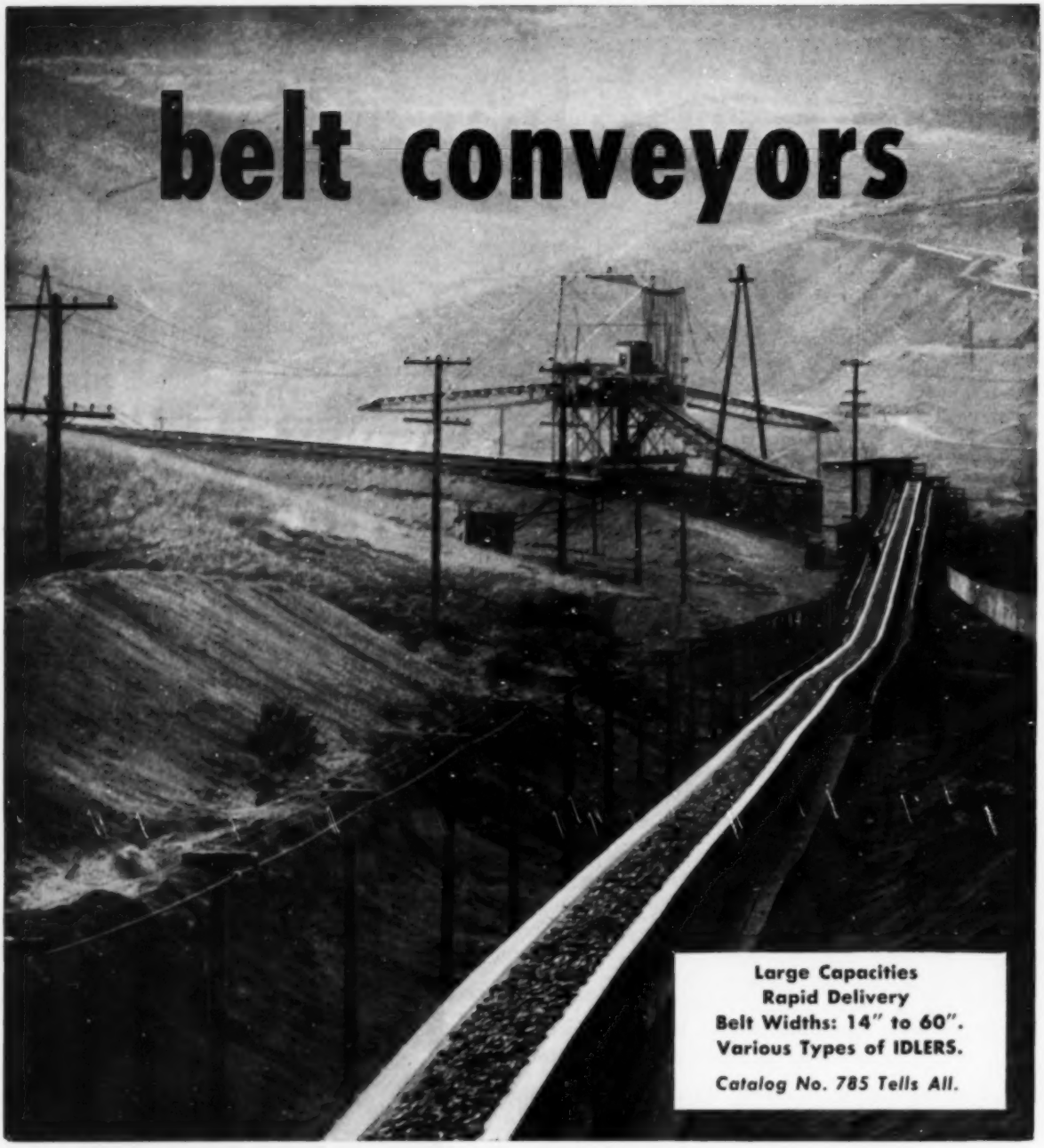
AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION

409 EAST 14th STREET • CHICAGO HEIGHTS, ILL.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que. Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

belt conveyors



Large Capacities
Rapid Delivery
Belt Widths: 14" to 60".
Various Types of IDLERS.

Catalog No. 785 Tells All.

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

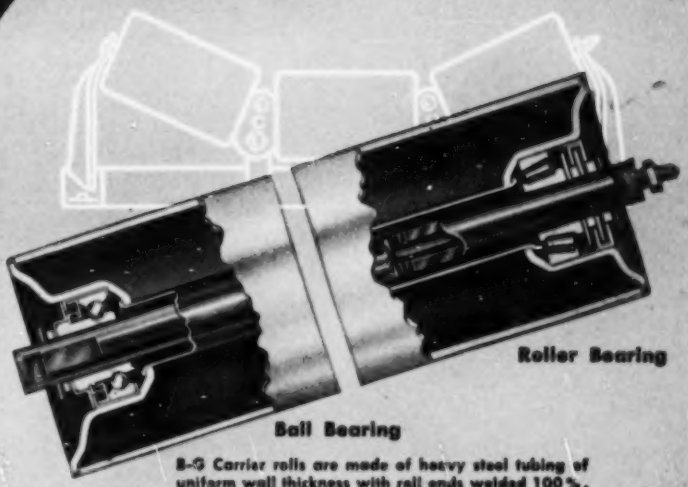
IF IT'S MINED, PROCESSED OR MOVED
. . . IT'S A JOB FOR JEFFREY!

A double check THAT SINGLES OUT B-G BELT CARRIERS

BUILT FOR LO[illegible]R BELT LIFE, LESS CARRIER MAINTENANCE...

Check the B-G Belt Carrier design and you'll find a combination of features that means long, low-cost service. Carrier rolls, for instance, stand out under rigid comparison: ¾" shafts . . . large, high-capacity ball or roller bearings . . . 100% welded and finished hubs . . . labyrinth grease seal . . . all are evidence of highest quality manufacture. Rolls are mounted on a heavy angle steel base with built-in 2° tilt for automatic belt training to assure continued accurate belt alignment and minimum belt wear.

If you are faced with Belt Carrier replacement — if you're thinking of a new belt conveyor — get the full story on how Barber-Greene Carriers will stay true and smooth running through more years of service.



Roller Bearing

Ball Bearing

B-G Carrier rolls are made of heavy steel tubing of uniform wall thickness with roll ends welded 100%.

OVER 80 STOCKING DISTRIBUTORS

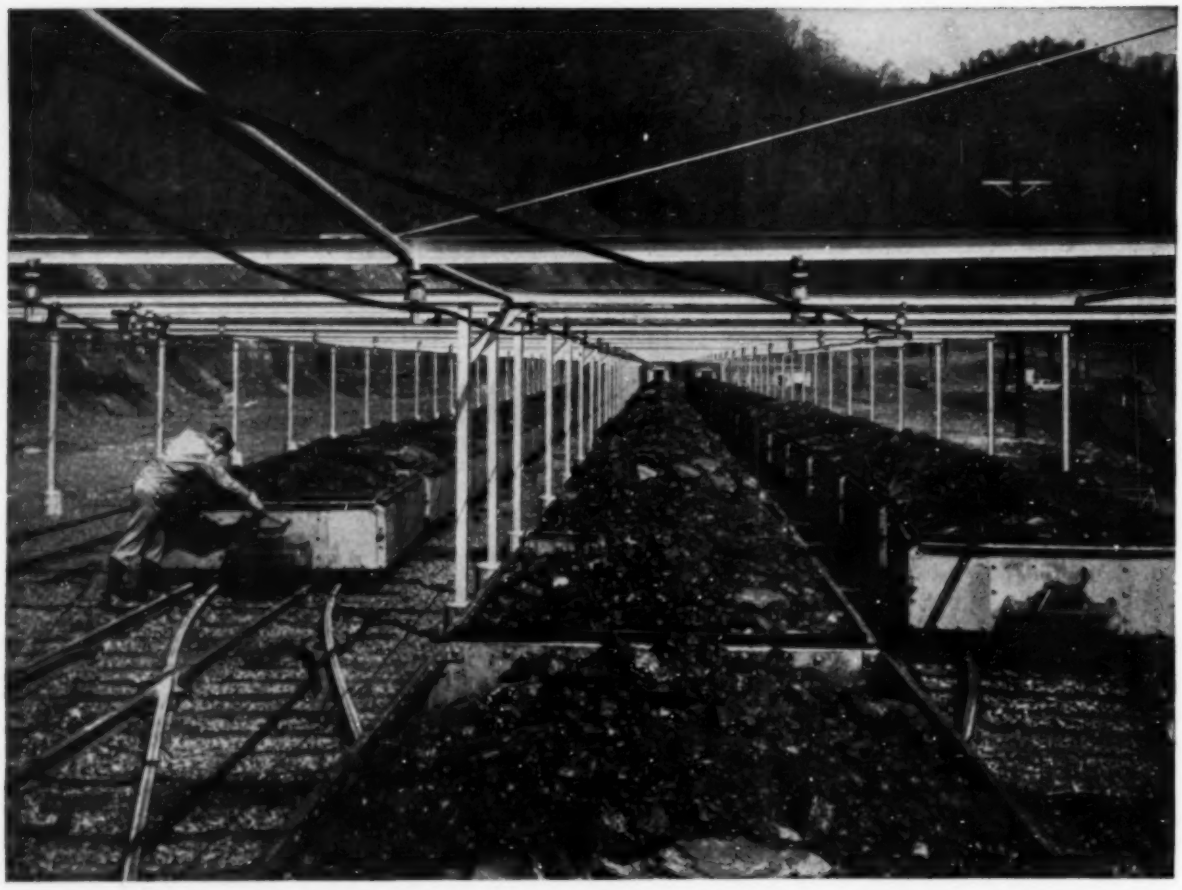
Rolls are mounted on all steel, jig-welded self-shedding angle.

Also, fast, reliable B-G Distributor service can help prevent shutdowns and minimize time lost when conveyor trouble occurs — many carry B-G Belt Carriers in stock, available for fast delivery.

Your B-G Distributor offers carriers in three roll diameters (4", 5", 6")—and in 18", 24", 30", 36" and 42" widths. These as well as impact and self-aligning B-G Carriers are fully described in Catalog 76C. Write for your copy.

Barber-Greene BG

Aurora, Illinois, U. S. A.



These Loads Don't Spare the Track

No reason why they should. The track was built for just such loads and will handle even heavier ones. Not for just a year or two, but for many years to come.

This is part of a large, complex Bethlehem prefabricated track system in West Virginia. The trackage covers many acres of ground and includes about everything you've ever seen in a mine haulage layout . . . heavy crossings, turnouts, crossovers, frogs, switches, switch stands, guard rails, braces, joint bars, tie plates, spikes, bolts and nuts. The rails, big and sturdy, were cut, curved, and drilled in the Bethlehem shops before shipment.

Long before a foot of track was built or laid, Bethlehem engineers spent weeks in a study of the mine's requirements. Loads were figured; every curve, crossing, and turnout carefully calculated. By taking advantage of existing terrain, it was possible to use long straightaways in many parts of the system. Expert planning resulted in trackage that was easy to install and fully capable of handling the mine's heaviest loadings.

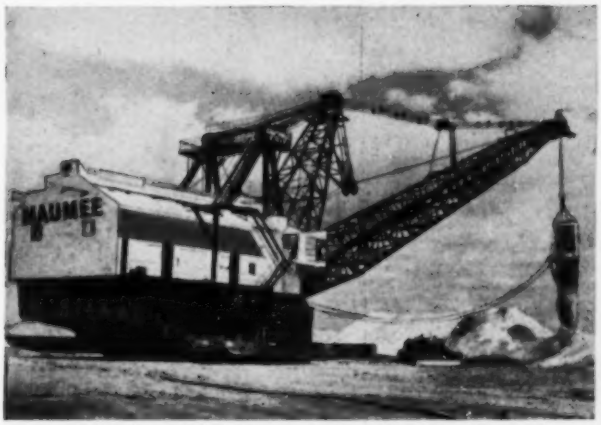
If your property has trackways that need expansion, or if your program includes a whole new layout, we suggest you talk with one of our engineers. He will be glad to explain in detail how Bethlehem prefabricated mine track can be the answer to many common haulage problems.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

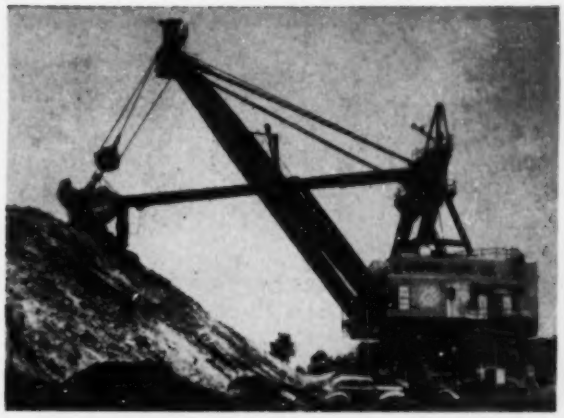
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM PREFABRICATED TRACK

BETHLEHEM STEEL



Total Weight—2,410,000 lbs. • Dipper Capacity—25 cu. yds.
Dipper Weight (full load)—130,000 lbs.

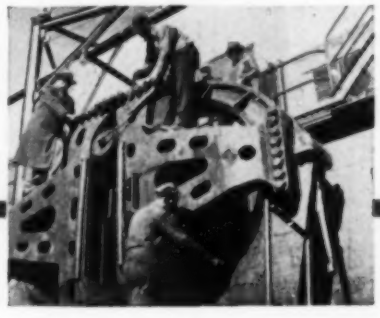


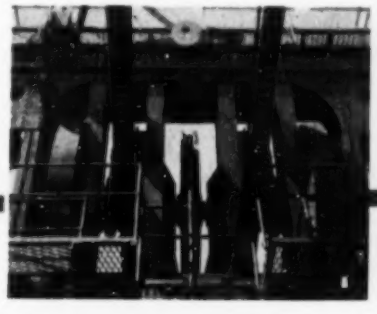
Total Weight—3,200,000 lbs. • Boom—107 feet
Empty Dipper Wt.—42 tons • Dipper capacity—40 cu. yds.

THE WHITMORE PLAN OF JOB STUDY AND GUARANTEED RESULTS

Whitmore Engineers live with each piece of equipment during an extensive job study covering every possible part to be lubricated. There is no one cure-all lubricant for every purpose. We know the same grease is not always satisfactory even though equipment and parts are of similar manufacture. Variations in manner of operation and individual handling make each job a special problem.

Let us prove we can save you money through prolonged life of parts, elimination of breakdown time and increased efficiency. We guarantee results. Write or call us today.





Serving the Mining Industry for more than Half a Century

WHITMORE'S
PRESSURE-PROOF
LUBRICANTS
SUPER E P

BROAD CRAWLER TREADS ENABLE G-E SHUTTLE CAR TO EASILY NEGOTIATE SOFT OR WET BOTTOMS, EVEN WHEN FULLY LOADED

New G-E Shuttle Car Proving Ideal for All Types of Mining Conditions

Low ground pressure, greater maneuverability, lower maintenance costs made possible with crawler treads

Using crawler treads instead of rubber-tired wheels, the new General Electric shuttle car is proving its efficiency and versatility under all types of mining conditions. Fully loaded, the car has only 20 pounds per square inch ground pressure. With a 14 to 16 foot turning radius, the car is ideal for operation where tunnels are narrow and turns are sharp. The wide conveyor, which is made possible by the use of crawler treads and the absence of wheel-wells, increases carrying capacity up to 300 cubic feet (with 12-inch sideboards).

The G-E shuttle car is simplicity itself in design and ease of operation. All motors and controls, though well-protected from abrasive materials and meeting U.S. Bureau of Mines' specifications, are easily accessible for servicing and maintenance.

Whatever mining conditions you face—no matter how rigorous they are—the new G-E cable-reel track-laying shuttle car can meet your requirements of service and economy. For complete information contact your nearest G-E sales office. General Electric Company Schenectady 5, New York. 120-65

1878 75 1953 YEARS OF ELECTRICAL PROGRESS

Only 42 inches high, the G-E shuttle car has a carrying capacity 30 per cent greater than cars of conventional design. Car above, at Jamison Coal and Coke Co., Hostetter, Pa., shows simplicity of unloading in tight quarters.

You can put your confidence in—

GENERAL ELECTRIC

Catch fish with wire rope?

Yes, gentlemen, there's more fish caught with wire rope than ever nibbled at a baited hook. Satisfying America's appetite for nutritious seafood is a stupendous job, calling for fleets of fast, powerful trawlers that net their catches in prodigious quantities. To hold and haul in the heavily laden nets, the fishing industry annually uses millions of feet of wire rope.

There's a good chance the fish you eat comes to your table with the help of Wickwire Rope. Because, for over half a century, Wickwire Rope has "grown up" with the nation's fisheries. As in so many other activities where wire rope is used, the men who man the fishing fleets have a high regard for its strength and durability under the toughest conditions.

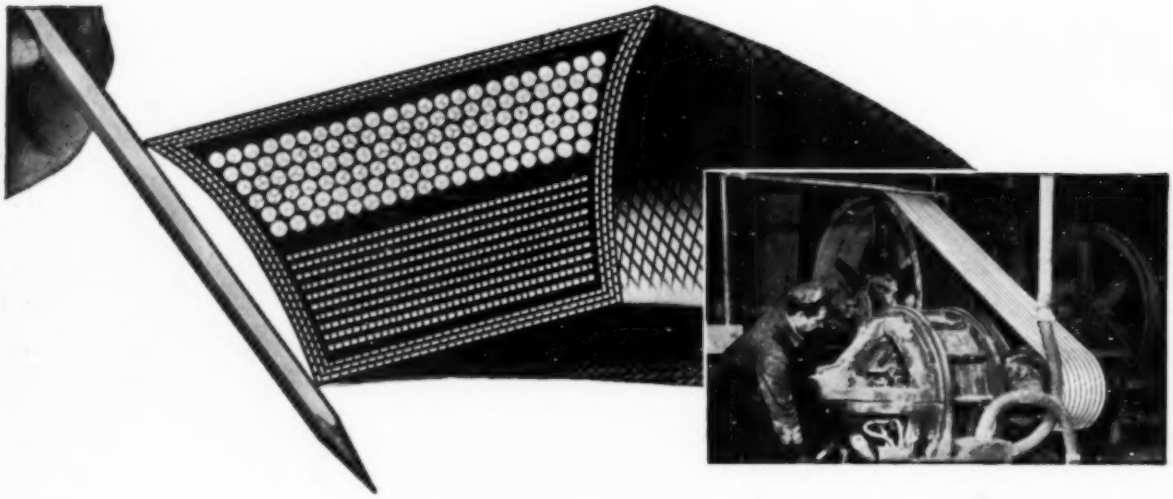
A YELLOW TRIANGLE ON THE REEL IDENTIFIES WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION—Abilene (Tex.) • Denver
Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
THE CALIFORNIA WIRE CLOTH CORPORATION—Los Angeles
Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga
Chicago • Detroit • Emlenton (Pa.) • New Orleans • New York • Philadelphia

1757

WICKWIRE ROPE

CF&I PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

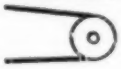


Gates V-Belts are built with CONCAVE SIDES

(U.S. PATENT NO. 1813698)

...that's why they last longer!

If you want lower V-Belt costs, just make this simple test...pick up *any* V-Belt and bend it as if it were going around a pulley.



As the belt bends, grip its sides between your fingers and thumb.

If the belt has *straight sides* you feel the sides bulge out. This forces the sides of the belt to press *unevenly* against the V-pulley . . . and you get concentrated wear at the points shown by the arrows.

Now, try this same test with the V-Belt that is built with CONCAVE SIDES **—the Gates Vulco Rope.**

As this belt bends, you can feel the CONCAVE SIDES *fill out* and become perfectly straight.

These sides press *evenly* against the V-pulley. All wear is distributed *uniformly* across the full width of the Gates Vulco Rope and the CONCAVE SIDES therefore mean longer belt life and lower V-Belt costs for you.

When you buy V-Belts, be sure to get the V-Belt with the CONCAVE SIDES—the Gates Vulco Rope!

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and in 71 foreign countries.

CS-538

V-Belts — Hose
Molded Rubber Goods
for industry
World's Largest Maker of V-Belts

Gates® VULCO ROPE DRIVES

THE GATES RUBBER COMPANY • DENVER, U.S.A.

5 reasons why modern mines buy Willison Automatic Couplers

1 SAFE
Willison Automatic Couplers require no manual assistance . . . no need for men to go in between cars to couple or uncouple a Willison Automatic!

2 FAST
All Willison couplers have the same contour . . . can be coupled at either end of car or locomotive . . . no time-consuming reversing is necessary.

3 STABLE
Close coupling of Willison couplers eliminates damaging slack . . . permits higher speeds with maximum stability . . . reduces surging and spilling.

4 PROTECTIVE
Two parts, the head and the lock, do all the work on every Willison coupler . . . take the shocks and strains to protect cars and locomotives from damage.

5 PROVED
Over 50,000 Willisons speed handling and cut costs in mines and industrial plants everywhere. Why not specify Willison Automatic Couplers for your haulage needs?

WRITE TODAY for Folder 5452 for more information on Willison Automatic Couplers. National Malleable and Steel Castings Company, Cleveland 6, Ohio.

A-8640

NATIONAL Products FOR TRANSPORTATION AND INDUSTRY

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Cleveland 6, Ohio

Willison Automatic Couplers • Friction & Rubber Draft Gears • Car Trucks • NACO Steel Wheels • NACO Steel Links & Swivel Hitchings Est. 1868

Stop That Tramp Iron!

with STEARNS ELECTRO-MAGNETIC PULLEYS

A Stearns Electro-Magnetic Pulley protects your crushing equipment by removing all tramp iron automatically — economically. Reduce shut-down time and keep your repair charges LOW — install a Stearns Electro-Magnetic Pulley. It is the only economical and effective insurance against the tramp iron hazard.

Whether your problem is the removal of tramp iron or the concentration and beneficiation of complex ores, Stearns has EXPERIENCED ENGINEERED equipment to meet your specifications.

STEARNS
Permanent-Magnetic Pulley

For a thorough investigation of your separation problem, Stearns offers complete laboratory research facilities. Write today for details on testing of sample material.

STEARNS
Suspended Rectangular
Separation Magnet.

MAGNETIC EQUIPMENT FOR ALL INDUSTRY 1006

STEARNS MAGNETS

STEARNS MAGNETIC, INC.
661 South 28th Street, Milwaukee 46, Wis.

NEW COAL MASTER ROOFBOLTER Augers · Drill Rods

STANDARD SHANK for
- Baker-Fletcher
- Chicago-Pneumatic
- Joffrey, Joy and other Shanks furnished in welded construction

STANDARD SOCKET for any make bit, as
- Kennametal
- Sulmet
- Firthite
- Carboloy

ANY LENGTH from 12" to 84"
(longer on request)

...and here are 3 reasons WHY!

1 **ONE-PIECE, NON-WELD CONSTRUCTION.** Shanks and sockets are both an integral part of every Coalmaster Auger or Drill Rod—fashioned right from the same piece of steel (not welded as in other competitive makes). The result: the most rugged durability possible, for either wet or dry drilling, with minimum loss due to breakage.

SHANK FOR B. F. DRILL

SHANK FOR C. P. DRILL

2 **HEAVY-DUTY TUBING.** Husky-walled seamless steel tubing throughout . . . a high-tensile alloy, heat treated for maximum performance.

3 **SPIR-L-WELD FLIGHT.** An exclusive Coalmaster feature . . . smooth, non-clog design for producing a clean, accurate hole—without drag or jam. Sharply speeds up production time, cuts operating costs, at each hole.

Distributed by:

AUSTIN POWDER CO.
Cleveland, Ohio

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Indianapolis, Ind.

SALEM TOOL COMPANY
Salem, Ohio

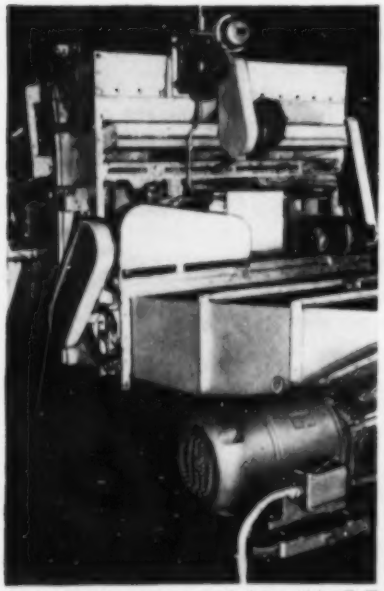
DRILLING COALMASTER TOOLS

CENTRAL MINE EQUIPMENT COMPANY

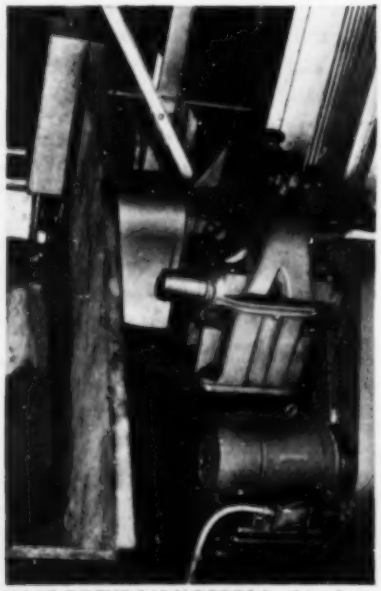
ST. LOUIS 15, MO.

CENTRALIZED CONTROL of plant motors at Crown Mine's new preparation plant co-ordinates processing, saves steps, uses manpower most efficiently. This control desk, one of three in the plant, controls the operation of the loading booms.

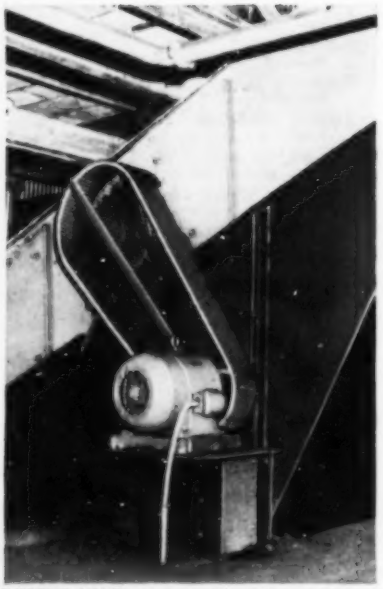
New coal plant cuts downtime



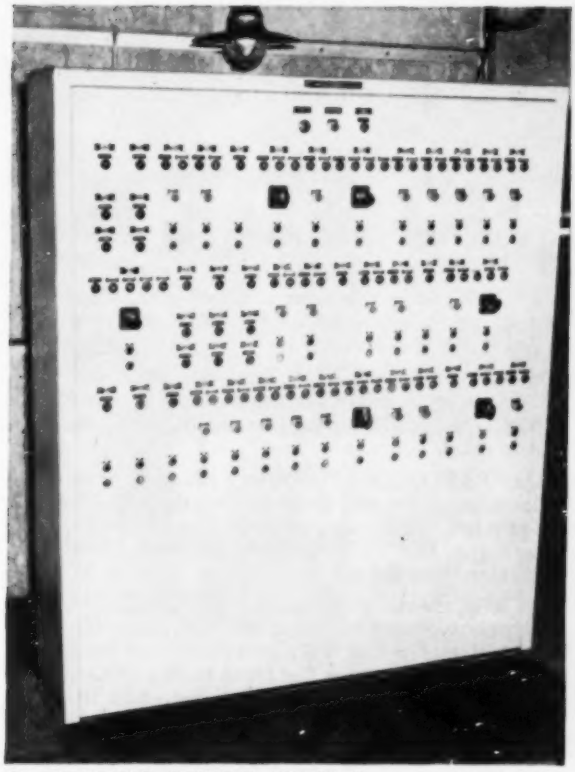
PROTECTED against coal dust, this G-E totally enclosed fan-cooled motor drives an air-flow cleaner in the prep plant.



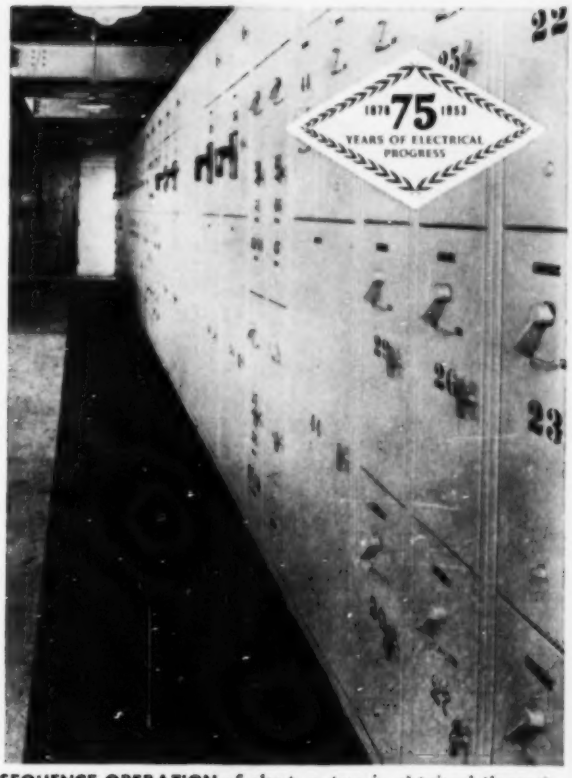
MOST OF THE 146 MOTORS in this plant, like this one driving a crusher, are G-E totally enclosed fan-cooled motors.



DEPENDABLE service with only minimum maintenance is typical of G-E motors, like this one driving an ROM apron feeder.



CO-ORDINATED CONTROL SWITCHES are combined with indicating lights in this panel benchboard on the jig floor.



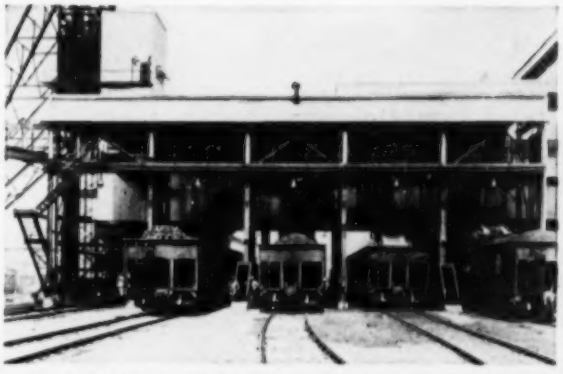
SEQUENCE OPERATION of plant motors is obtained through interlocks and timers in this G-E Cabinetrol assembly.

with co-ordinated G-E drives

Crown Mine uses G-E motors and control system-engineered to meet plant's needs

Freeman Coal Corporation's new Crown Mine preparation plant at Farmersville, Illinois, is a fine example of the way General Electric co-ordinates motors and control into a smooth-working system to maintain consistently high output at low cost. From self-dumping skips for ROM coal to automatic loading booms for clean coal, G-E system-engineered drives keep processing in step, minimize downtime, make most efficient use of manpower.

You, too, can profit by putting G-E engineering leadership to work on your preparation-plant problems. For more information, contact your local G-E Apparatus Sales Office, or write for Bulletin GEA-5308, "Electrified Coal Preparation," to General Electric Co., Section 663-31, Schenectady 5, N. Y.



LOADING BOOMS discharging into railroad cars are controlled from boom operator's cab (upper left). Sequence control utilizing G-E Cabinetrol co-ordinates conveyor operation.

Engineered Electrical Systems for Coal Preparation Plants

GENERAL ELECTRIC

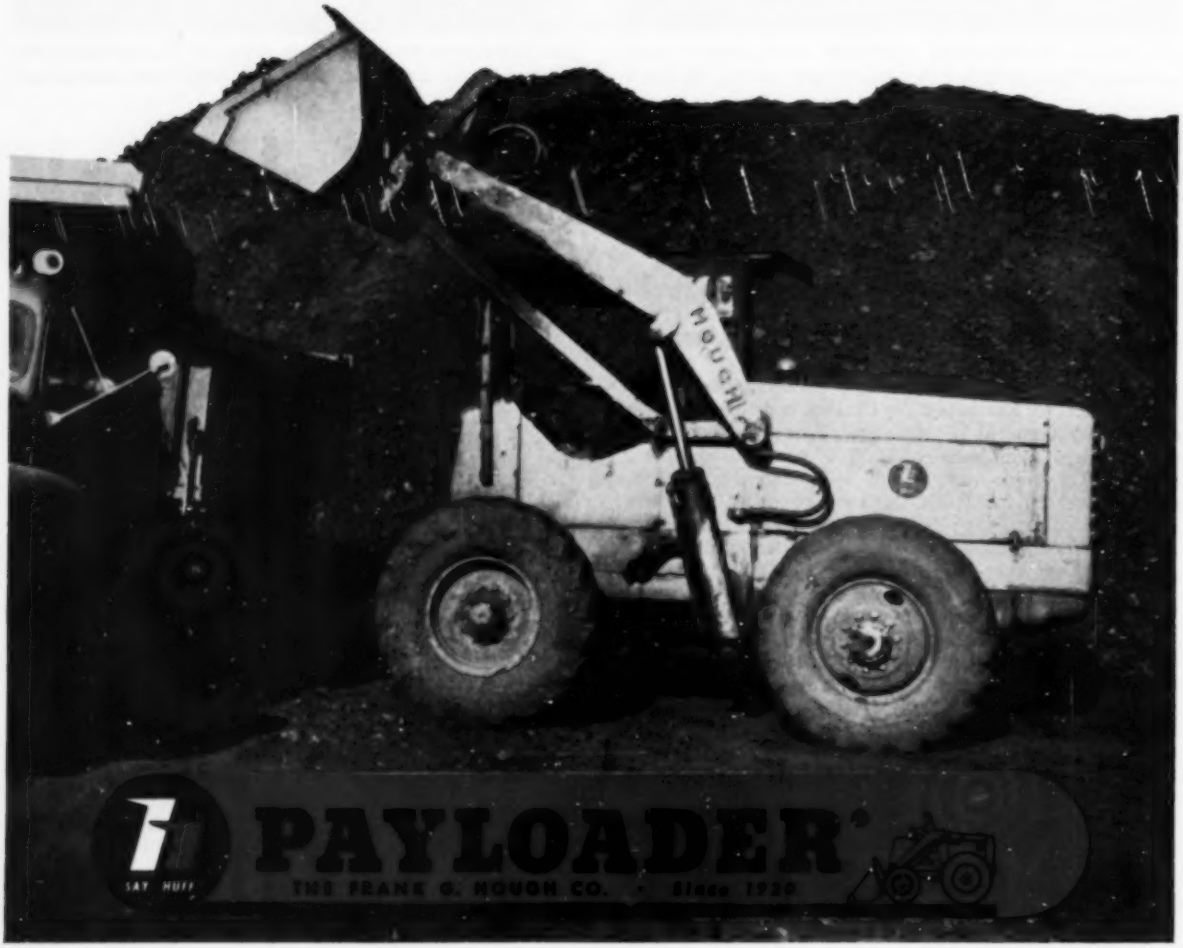
C&P Coal Co. chooses PAYLOADER

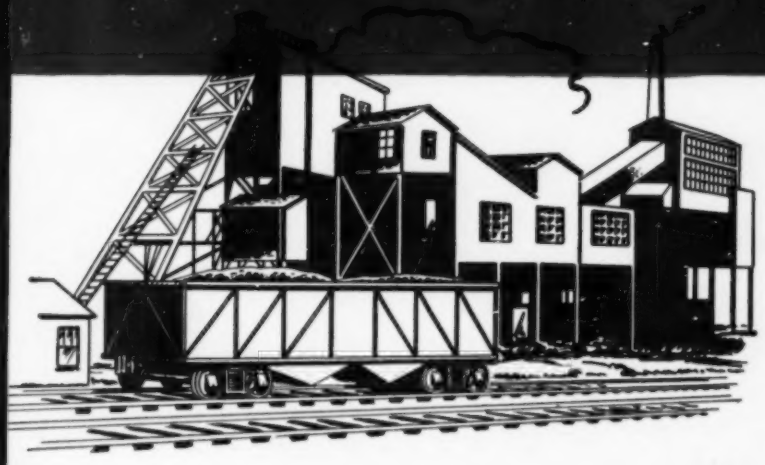
C. & P. Coal Co., with strip mine at Flemington, West Virginia, has used the 4 wheel drive "PAYLOADER" for over two years with profit and satisfaction.

Their big 1½ cu. yd. "PAYLOADER" loads trucks at the stockpiles, levels and trims stockpiles, feeds conveyors from stockpile, delivers cars to the loading tipple and does many other lifting, carrying and moving jobs around the tipple and in the strip pit.

Mr. C. T. Railing, partner, says, "The "PAYLOADER" has been a life saver to us as we can stock coal when cars are not available and avoid shutting the strip job down. Also if the haul road is bad, we can continue to load cars from the stockpile and thus keep our car rating. The "PAYLOADER" is a handy piece of equipment to have on the job."

Whether your mine is underground or strip, the records show that "PAYLOADER" tractor shovels can be of great assistance in cutting costs and improving operations in many directions. Get full "PAYLOADER" facts from your Hough Distributor or write The Frank G. Hough Co., 735 Sunnyside Ave., Libertyville, Ill.

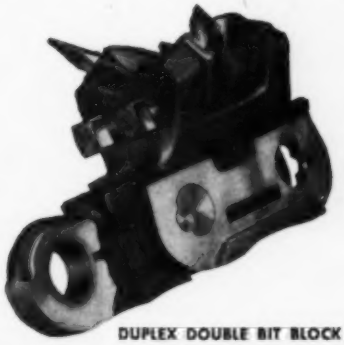




EQUIPMENT *BY CINCINNATI*
TO MEET THE CHALLENGE OF EVERY CUTTING CONDITION

THE Cincinnati Mine Machinery Company has long been recognized as the leader in the field of cutterchains and allied products. Whenever unusual conditions have required the development of special cutterchains for either new or existing machines, Cincinnati Engineers, in co-operation with the mine operators, have always met these requirements successfully. Shown here are a few of our many developments . . . additional new designs are now being perfected and proven in the field. Whether your cutting conditions are average or require individual engineering we can be of assistance to you.

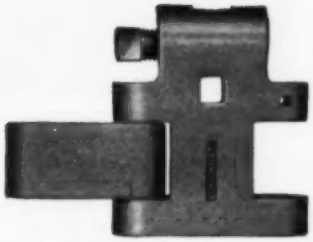
LONG HANDLE WRENCH FOR CARBIDE BITS



DUPLEX DOUBLE BIT BLOCK

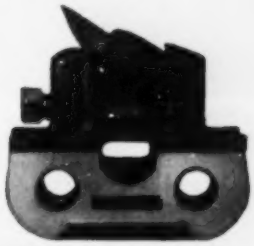
TYPICAL SPROCKET

DOUBLE BIT BLOCK FOR JOY CONTINUOUS MINER (Rotary Head Type)



NARROW KERF TRIMMING CHAIN

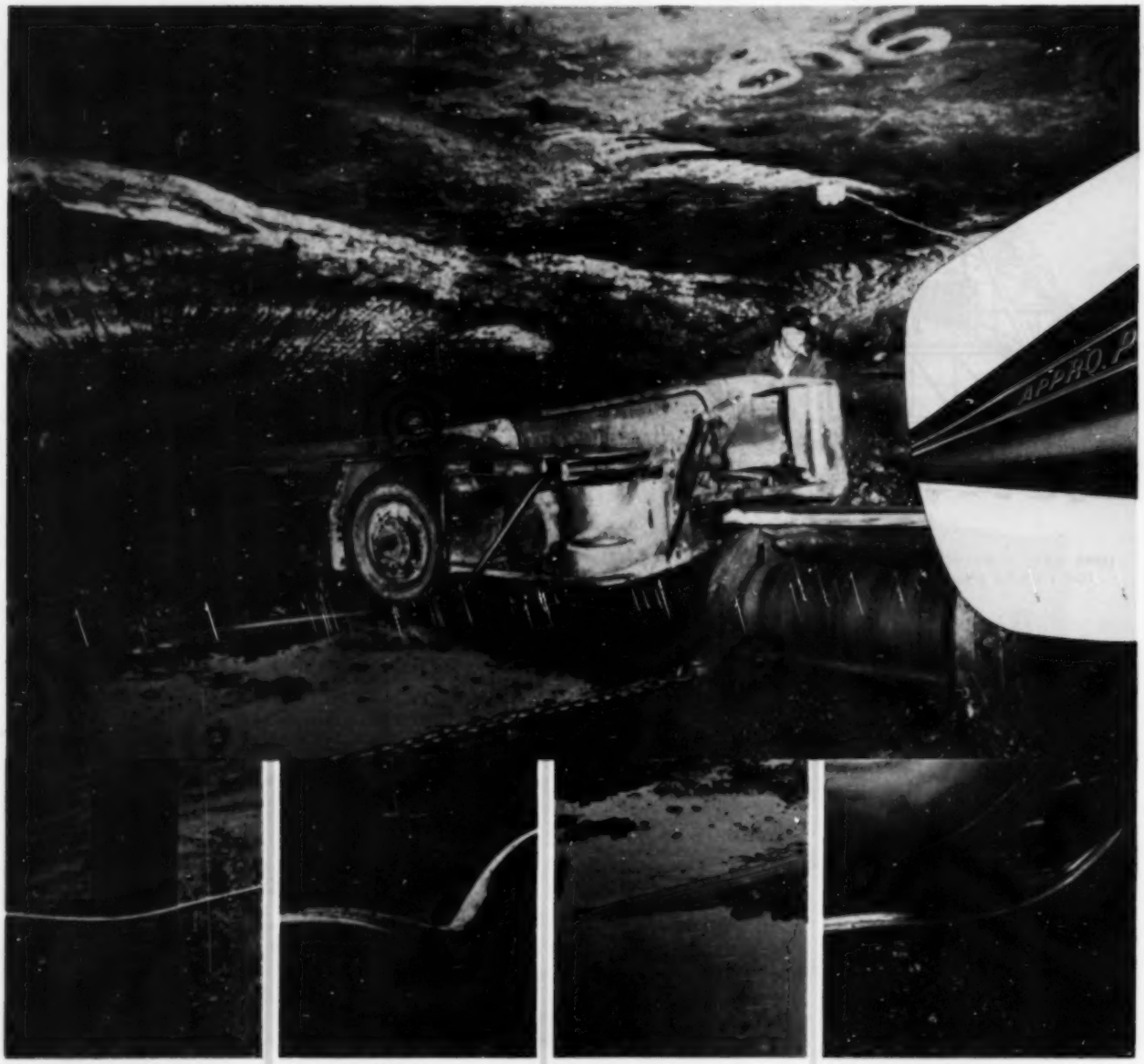
STANDARD ½" x 1" BIT UNIT WITH STANEX ASSEMBLY



CUTTERCHAIN BLOCK FOR CINCINNATI DUPLEX THIN KERF CUTTERCHAIN

the **CINCINNATI** **MINE MACHINERY CO.**
CINCINNATI 25, OHIO

How to reduce cable failure twisting, bending, pulling



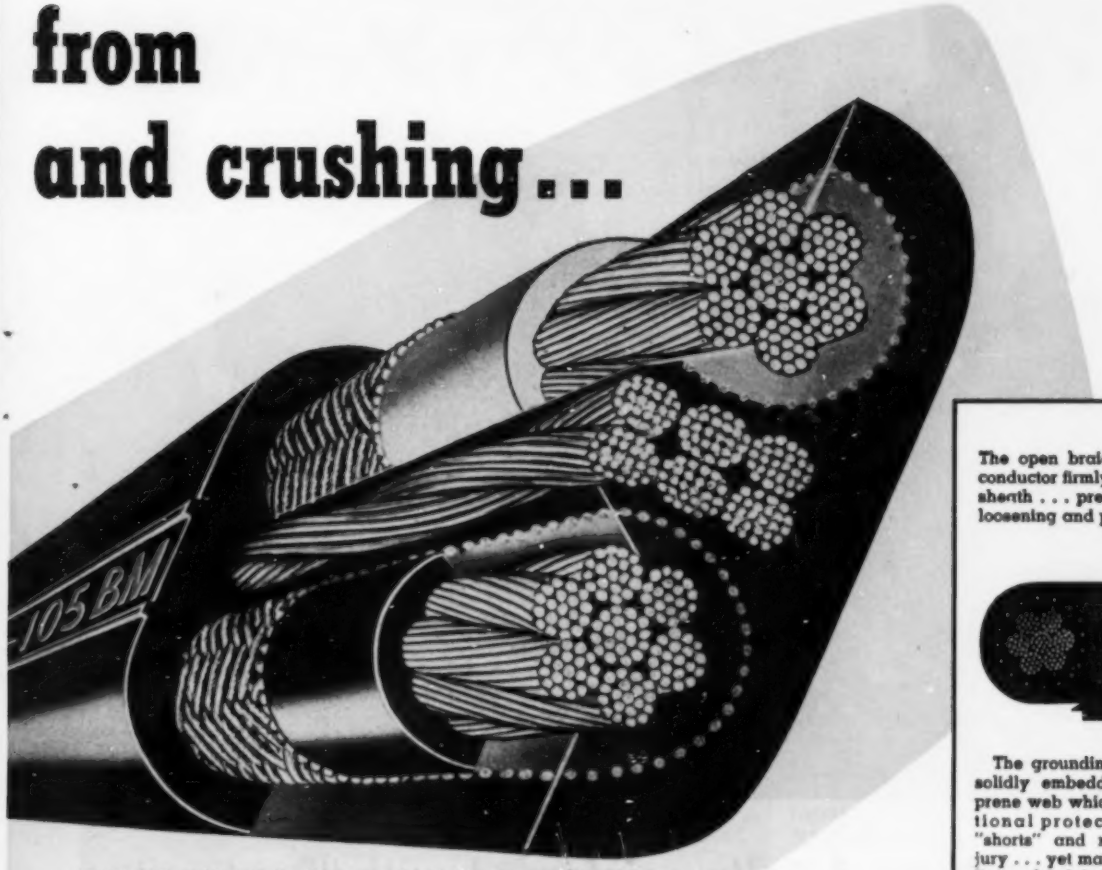
TENSION—Tire-tough compact construction, molded in lead, protects Rome 60 Mining Cables against extreme tension and abrasion.

TWISTING—Firm interlocking braid prevents loosening of conductors and sheath separation when cables are twisted and bent.

IMMERSION — Protection against moisture, corrosion and flame is assured by the rugged sheath and a specially compounded rubber insulation, suitable for operation up to 75°C.

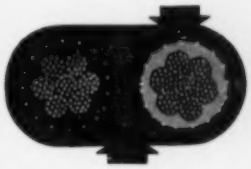
CRUSHING—Resilient Neoprene web between insulated conductors and grounding conductor provides high impact resistance and protection against "shorts" when cables are accidentally crushed.

from and crushing...



"P-105 BM" molded in the Neoprene sheath is your assurance of compliance with Federal and Pennsylvania Safety Codes.

The open braid around each conductor firmly interlocks it to sheath . . . prevents twisting, loosening and pulling.



The grounding conductor is solidly embedded in a Neoprene web which gives exceptional protection against "shorts" and mechanical injury . . . yet maintains flexibility and minimizes conductor distortion and fatigue.

Interlocking braid on Rome 60 Shuttle Car Cables prevents sheath separation

Look at the beating a shuttle car cable takes during just one shift! In the space of a few hours it is pulled back and forth from face to locomotive adding up to miles through mud, crushed rock and coal. It is twisted, bent and scraped around timbers, subjected to extreme tension, and crushed under machine wheels. It is attacked by moisture and corrosive oils and greases.

Rome 60 mining cables are especially designed to stand up under these severe operating conditions and to give you exceptionally long service life. Firm interlocking braids securely fasten each conductor to the tough Neoprene sheath—preventing internal twisting and separating from sheath. A tough, resilient Neoprene web separates insulated conductors from grounding conductor—assuring maximum flexibility, high impact resistance and protection against "shorts." The Neoprene sheath itself is molded in lead to a tire-like toughness—providing high resistance to oils, acids, abrasions and flame. Heat and moisture resistant rubber insulation is suitable for operation up to 75° C.

Plan now on getting full value from all your mining cables and preventing costly down time by standardizing on Rome 60 mining cables.

It Costs Less to Buy the Best

The Rome 60 Line Includes:

- Single Conductor Locomotive Cables
- Concentric Mining Machine Cables
- Flat Twin (Parallel Duplex) Mining Machine Cables—Types W and G
- Type SO Portable Cords
- Multiple Conductor Portable Power Cables—Types W and G
- Shot Firing Cord
- Mine Power Distribution Cable
- Shovel and Dredge Cables

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ROME CABLE ROME, N.Y.

Left Fork Fuel Company finds that

4 belts reinforced with "Cordura" solve tough transport problem...end work stoppages

"CORDURA" REINFORCED BELT NO. THREE, 2,100 feet long, with metal roof 18" above the belt. This 30-inch, 5-ply belt carries 1,000 tons of coal per 16 hours. The pay load is transferred at the junction points by overlapping belts. The entire installation requires the attention of only one man per eight-hour shift.

Impassable roads in bad weather made the transport of coal from the mine to railway spurs a major problem for the Left Fork Fuel Co., of Quinwood, West Virginia. Trucks often "bogged down" in mud, and stoppage of 1,000 tons of coal production per day resulted.

Engineers solved the problem by recommending installation of 4 "Cordura" reinforced conveyor belts. A total length of 9,240 feet of belting was required. These belts were manufactured by the B. F. Goodrich Company. They were installed in August 1952 and have operated continuously with minimum maintenance.

The high strength of Du Pont Cordura* High Tenacity Rayon makes possible belting that's stronger yet thinner . . . belting that troughs better. And its low stretch saves costly shutdowns for take-up and resplicing.

Before you order your next conveyor belt, be sure to inquire about the use of "Cordura" rayon in belts. We'll send you the names of suppliers . . . together with full information about "Cordura" rayon. Just write for your free copy of the booklet "Sinews for Industry" to: Textile Fibers Dept., Room 2520-C, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del. (Offer good only in U. S.)

*REG. U.S. PAT. OFF.

Du Pont "Cordura" High Tenacity Rayon

STRENGTH AT LOW COST

DU PONT

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BETTER THINGS FOR BETTER LIVING...*THROUGH CHEMISTRY*

LOAD BINS FAST... AVOID BREAKAGE

HOLMES

LOWERING SPIRALS

- **No Droppage to degrade your coal**
- **No wear and tear on bins**
- **Costs nothing to operate**

Robert Holmes Lowering Spirals are designed to lower material through the use of centrifugal force, thus eliminating the need of an inside retaining lip. Each spiral is formed like a well-banked race track. The coal automatically slows down when it reaches the "safe" speed limit, regardless of the distance of travel.

As there is no retaining lip, the coal slides gently off onto the peak of the pile to form a natural angle of repose. In this way, the coal is spread out uniformly . . . a real advantage where segregation is a problem.

Lowering spirals are essential to proper handling in surge bins, run-of-mine storage bins and pockets, mine retail sales bins, and consumer storage systems.

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THIS INSTALLATION is located at the Jamison Coal & Coke Co. Mine 21, Hostetter, Pennsylvania. Photograph retouched to show interior construction.

CONTINUOUS-FLOW, ONE-PASS DRYING with

Baughman VERTI-VANE THERMAL COAL DRYER

Both low in initial cost and operating cost . . . each Verti-Vane unit is designed for capacities from 15 to 75 tons. It handles all coal sizes from 1½" down. Reduces surface moisture to approximately 2% in a "one-pass" operation. Minimum of moving parts and slow-speed operation tend to eliminate shift breakdowns and lost time. Easily adjusted for feed conditions . . . requires little attention.

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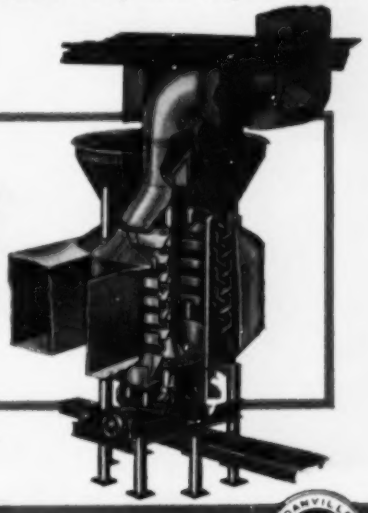

Bigger tonnages per day through continuous one-pass coal drying.

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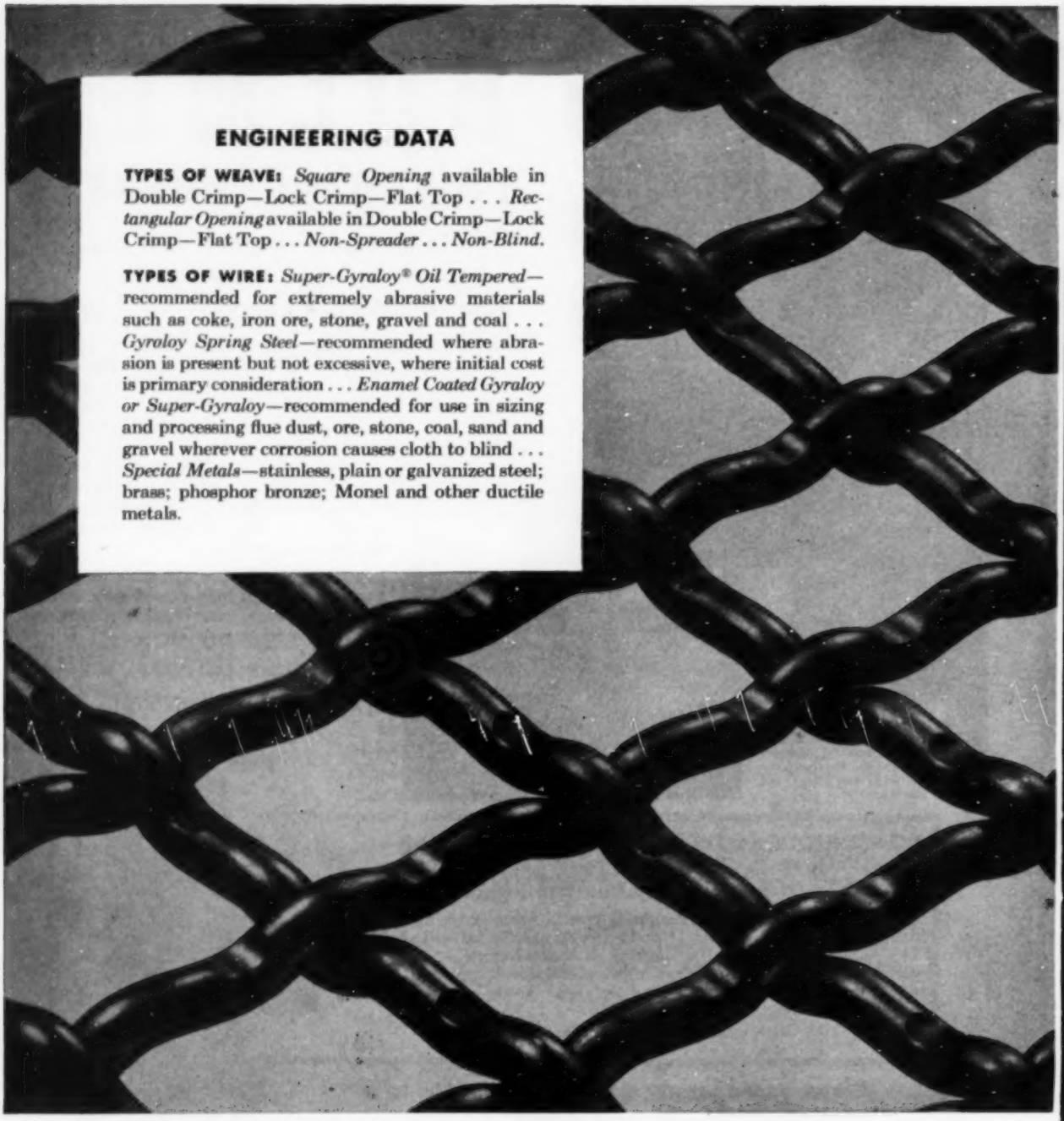
We'll Give You Better



ENGINEERING DATA

TYPES OF WEAVE: *Square Opening* available in Double Crimp—Lock Crimp—Flat Top . . . *Rectangular Opening* available in Double Crimp—Lock Crimp—Flat Top . . . *Non-Spreader* . . . *Non-Blind.*

TYPES OF WIRE: *Super-Gyraloy® Oil Tempered*—recommended for extremely abrasive materials such as coke, iron ore, stone, gravel and coal . . . *Gyraloy Spring Steel*—recommended where abrasion is present but not excessive, where initial cost is primary consideration . . . *Enamel Coated Gyraloy or Super-Gyraloy*—recommended for use in sizing and processing flue dust, ore, stone, coal, sand and gravel wherever corrosion causes cloth to blind . . . *Special Metals*—stainless, plain or galvanized steel; brass; phosphor bronze; Monel and other ductile metals.

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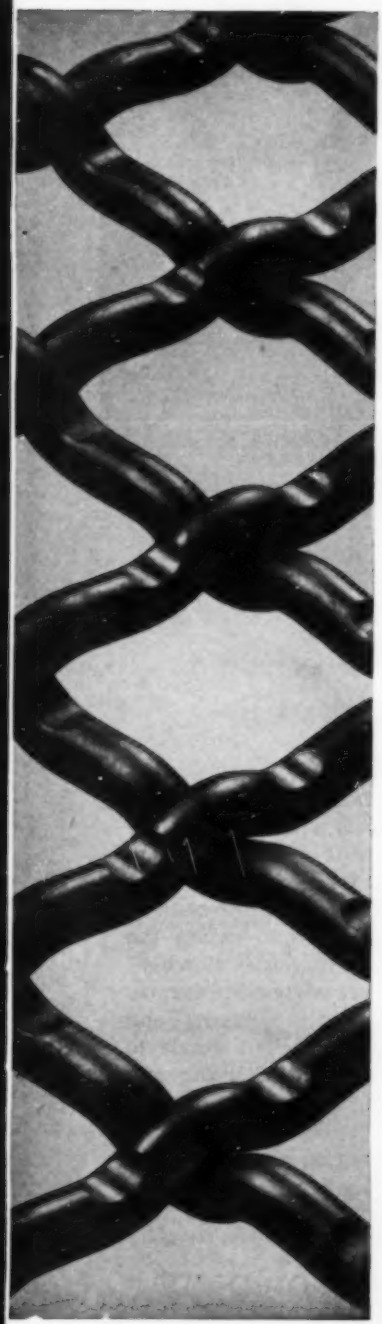
HEWITT-ROBINS

EXECUTIVE OFFICES, STAMFORD, CONNECTICUT

Screen Cloth Delivery



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For shorter delivery on any type of Hewitt-Robins screen cloth send us this information:

1. Type of screen—Name of manufacturer—Model of machine.

2. Kind of screen cloth desired: Specify type *weave*—type of *wire*.

3. Size of clear opening or mesh and wire diameter.

4. Type of edge formation: Flat edges — Welded — Reinforced hook strips.

5. Length and width of panels (width measured from outside to outside of bent hooks)—Height and length of hook strips—Degree of angle inside of hook.

6. For rectangular, non-spreader or non-blind openings: Specify direction of long slot (which dimension of cloth it parallels).

7. For dewatering decks: Size of openings in mm—Single, double or no depressions—Round or triangular profile stainless steel rods.

WRITE FOR SCREEN CLOTH BULLETIN No. 113-A1

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- ☐ —Dock
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☐ **PICKING TABLES**

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The New Louisiana Purchase

EVERY day America crosses a frontier—the frontier of a new market. It is the market created by an ever growing population. Since Pearl Harbor, our population has increased 23½ millions—more than all the people now living in the region west of the Mississippi once called the Louisiana purchase, that vast billion-acre area which provided us with geographical frontiers for a hundred years.

During 1952, 8,500 babies were born daily, increasing our population by nearly 3,000,000 people. New families and bigger families need more and bigger houses, more food, clothing, cars, roads, hospitals, churches, schools. Their needs call for continuing and increasing production from farms and factories.

There are those among us who say a decline in government spending will bring depression. But where is there room for depression when we add the population of another Minnesota or an Iowa to our nation each year—when the need for goods and services increases steadily? In fact, only by tapering off our vast programs of government spending can industry and business hope to provide sufficient goods to maintain our present standard of living and satisfy the demands of our ever growing population.

Let no one tell you America has crossed its last frontier.

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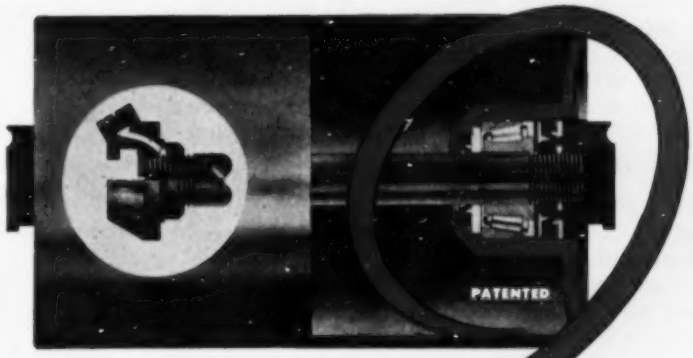
NEW UST* Continental Idlers

*** UNIT-SEALED PRE-LUBRICATED TIMKEN BEARINGS**

Saves Grease!
Saves Labor!
Saves Belts!



STANDARD DUTY IDLER

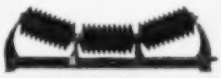
CGC UNIT-SEALED
CGC PRE-LUBRICATED
CGC TIMKEN BEARINGS

Continental's Unit-Sealed "UST" Conveyor Idlers, incorporating Timken Bearings, Garlock Klozures, are the answer to the operator's prayer.

The Unit Bearing Assemblies—"sealed unto themselves" provide an ample but not excessive grease reservoir. This represents a saving of grease and further eliminates any possible migration of the grease from upper to lower bearings on inclined rolls. The lubricant is a top quality water repellent grease of a stable consistency with a wide temperature range for long life.

Most important—this construction permits operating the Continental "UST" Idler without relubrication for 1-2-3 years depending upon the severity or character of conditions.

SELF-ALIGNING FLAT BELT IDLER



RUBBER DISC IMPACT IDLER

GRAIN CONCENTRATION IDLER

SELF-ALIGNING TROUGHING IDLER

For detailed information on these idlers write for Bulletin CA-116

Long Life- THE ULTIMATE IN MINIMUM MAINTENANCE

CG—5209

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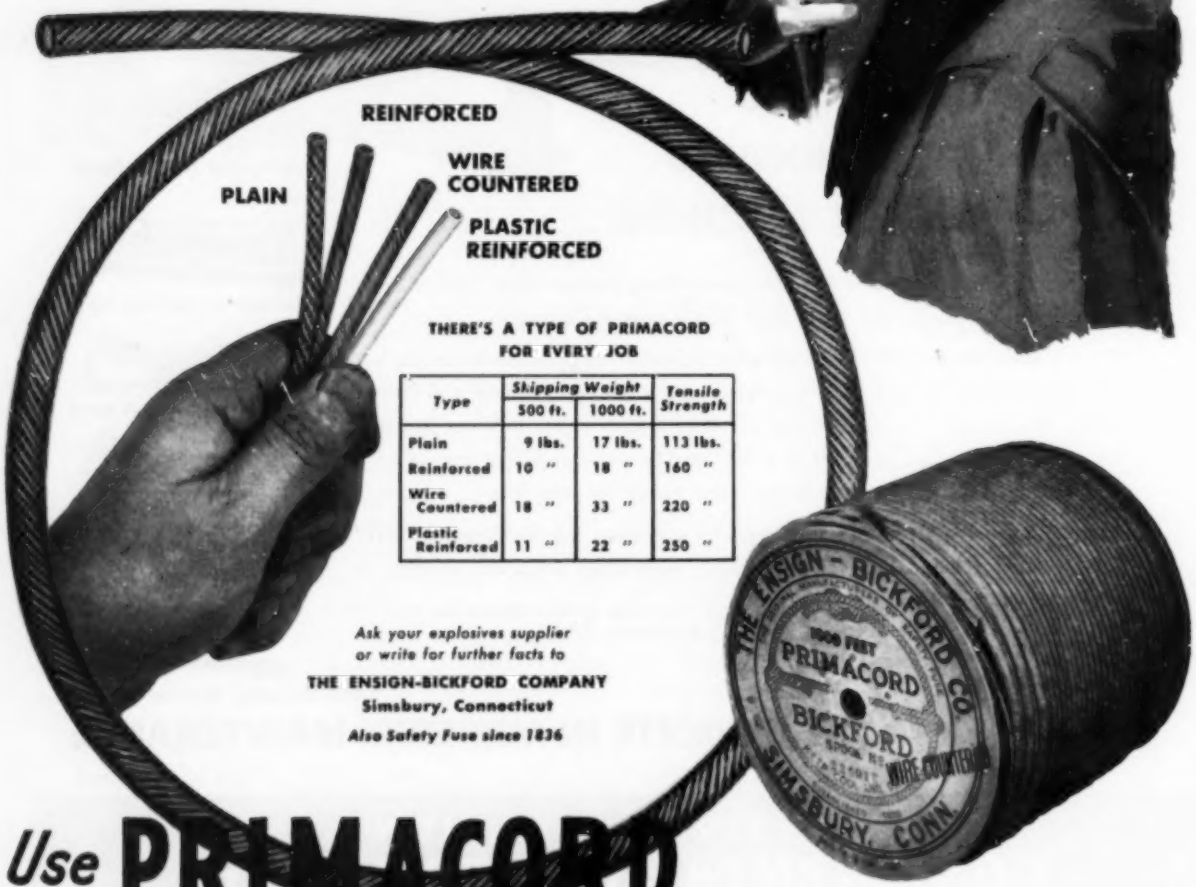
"I've used Primacord to shoot over-burden, ore, rock – and to ditch and clear right-of-way all-over the country. I get good results every time because I choose my Primacord as carefully as I use it.

"Plain Primacord I put down in small-bore or shallow holes, and also use it for the trunk line to hook them up. It's strong, light in weight, and economical. It's easy to tie tight to make a good connection.

"Reinforced Primacord is good insurance where I'm loading deep holes. It'll carry more weight and has a tougher cover to resist abrasion and cutting.

"Wire Countered Primacord is bound with fine wire. I always use it if I think there's any danger of sharp rocks or heavily reinforced explosives containers cutting the Primacord.

"Plastic Reinforced Primacord has a tough, waterproof plastic cover. I've used it in river crossings, in deep holes, or where field shots must stand a long time before blasting. It will take a lot of punishment, and is not affected by high summer heat or winter cold."



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Reinforced	10 "	18 "	160 "
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Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

JULY, 1953

IVAN A. GIVEN, EDITOR

Coal's Own

THE POSSIBLE BENEFITS from the operation of one or more coal-industry organized and owned corporations for the development, production, sale and service of coal-burning or coal-using equipment, and also, where necessary, of coal itself, has been the subject of some consideration in coal circles. The idea is to have a corporation big enough, and with capital enough, to really do a job in this field—and thereby widen coal markets. At, say, a dollar a ton for a substantial fraction of commercial sales, perhaps payable over a period of five years, that capital would be available.

Anthracite might well prove to have provided the precedent for such a corporation or corporations through its Anthracite Equipment Corp., a wholly owned subsidiary of the Anthracite Institute charged with the sale of anthracite for nonfuel uses. The corporation already has made progress in selling anthracite as a filter medium, and late in May announced a new addition to its line —AnthraAid, a carbonaceous filter aid. These nonfuel uses for coal can be expected to grow and, even though the tonnage may not be big the return in dollars is fairly impressive. Another example is coke from low-ash coal, through special cleaning processes, for electrode carbon, such as is used in aluminum reduction. This alone could mean a new market for over 1½ million tons a year. At between $25 and $30 per ton, some of the going prices for calcined petroleum coke, the possible income is not to be sneezed at.

There is real evidence to indicate that coal is assured a large future market almost automatically, though the slack times now prevailing make it difficult to accept this as a fact. Nevertheless, George A. Lamb, manager of business surveys, Pittsburgh Consolidation Coal Co., told the 46th annual convention of the Air Pollution Control Association on May 27 that within ten years, and perhaps by 1958, the load taken over by electricity from oil and gas alone will total one-third the total electricity used in 1952. Mr. Lamb estimates that replacement or supplementing of oil and gas with electricity in the residential field will require over 50 million tons of coal, and in the industrial field, 150 million tons.

While generation of electricity looms larger and larger all the time as coal's biggest outlet, there are many other uses for fuel as energy or as a raw material—some old, as home heating, and some new, as filter mediums and electrode carbon, and, eventually, as a source of synthetic gas and liquid fuel. These old markets—some partly lost and some, such as bunker fuel, almost completely lost—are significant markets and are well worth intensive cultivation. Adding in possible new fuel and nonfuel uses makes the prize even more valuable. A major effort certainly is indicated. Perhaps the coal and equipment corporation—industry-owned—is a real answer.

What D'Ya Know?

THE QUESTION which serves as the title for this homily is of course a familiar one. Some sharpen it up by asking, "What d'ya know for sure?" When you add "for sure," you are getting down to brass tacks, and this applies to raising efficiency, cutting cost, heightening quality and promoting safety in coal mining as well as to all other forms of human activity. If you don't know where you stand, what your bottlenecks are and what direction you should go to achieve results you have at least one strike on you in any improvement campaign.

The moral is obvious—know your operation or the particular phase of it you are handling. Look at it, study it, hash it over. Even a good hard look followed by a little skull practice in a quiet corner can show the way to a real improvement. And if you really want to get down to cases, the formal time study is a proven method. If you know for sure, whether you are a faceboss, a superintendent, or any other form of manager, you are well on the road to lowest-possible cost, highest quality and safety.

COAL AGE SPECIAL REPORT

How to Cut Cost

. . . With Modern Equipment

. . . And Modern Materials

What the cost-cutting machines are and how they can be used
What the cost-cutting materials are and how they can be applied

LABOR TODAY represents 40 to 55% of total coal-mining cost. In some mines it is less and in others more. A decade or two ago, labor represented 65 to 75% of mine cost, again with exceptions above and below. What is the minimum that can reasonably be expected in the future? Some put it at 20 to 30% of the total cost. If that is a reasonable goal, coal still has room for a substantial improvement until a point is reached where the cost of equipment becomes so large as to more than overbalance the savings in labor that can be attained. That day, however, is quite a distance off for the majority of the mines.

How has coal conserved manpower in the past and how can it continue the process in the future? There are perhaps three major answers:

1. Application of machines to all possible mining operations.

2. Use of these machines at the maximum possible rate—in other words, at as near rated capacity as possible.

3. Use of modern materials that conserve labor through reducing maintenance, machine breakdowns and the like.

What machines can do is shown pictorially on the opposite page of this Special Report. The four mines compared from the standpoint of number of men required per 100 tons of coal production in 1952 are all in the same field and in the same seam. Therefore, a reasonably fair comparison is possible, as follows:

Hand loading, 20.2 men per 100 tons of coal production.
Machine loading, 11.7 men.
Continuous mining, 6.5 men.
Stripping, 6.2 men per 100 tons.

Coal already has gone heavily into the use of machines, and has reaped some real benefits. As pointed out in the preceding article in this *Coal Age* Cost-Cutting Series ("Efficiency—Machine Made," May, 1953), the bitmuinous industry has spent approximately $1,000,000,000 for mining and auxiliary equipment, excluding preparation plants and other service facilities, since 1942. As a result of this expenditure—and of more skillful use of the machines—labor cost today is at least $1 per ton less than it otherwise would have been. The record is clear that machines have netted coal a handsome saving.

The record is equally clear for the modern materials used in coal mining, coal processing and maintenance. These materials, which range from alloys of steel and other metals to plastic sheet and plastic spray, provide, as examples, these characteristics: greater strength with less weight, resistance to corrosion and abrasion, ability to prevent the passage of air, and easier installation and application. Therefore, they provide these very definite advantages:

1. They last longer and therefore need not be replaced as often (see example on opposite page). Consequently, they reduce the cost of replacement—both labor and material.

2. They keep any machines in which they are used running longer without breakdowns or stops for service or maintenance, thus providing greater tonnage for the same wage dollar.

3. They require less labor to install or replace, or they reduce losses, such as air, and thus conserve power and materials. In addition, if they are lighter in weight, they can save manpower in installation, as with aluminum or plastic pipe, or they can save power and fuel, as with high-strength steel for mine-car and truck bodies.

For details on what these modern machines and materials are, and for what they can do in cutting costs, see the following pages of this *Coal Age* Special Report.

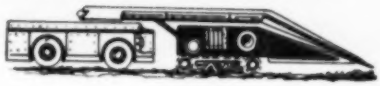
Capitalize on Modern Machines

Men Required per 100 Tons in 1952
Four Mines...Same Field...Same Seam

HAND LOADING

20.2

MACHINE LOADING



11.7

CONTINUOUS MINING

6.5

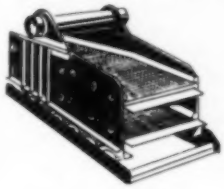
STRIPPING

6.2

Capitalize on Modern Materials

How One Company Increased Screen-Cloth Life

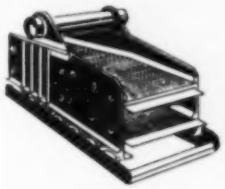
CARBON STEEL



J F M A M J
J A S O N D

12
MONTHS

STAINLESS STEEL



J F M A M J
J A S O N D
J F M A M J
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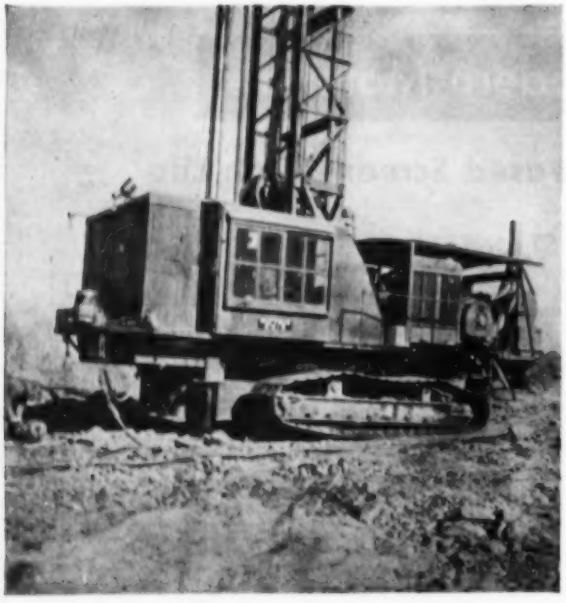
J A S O N D
J F M A

40
MONTHS

Up 20% Plus in 10 Years

Dippers up to 50 cu yd and dragline buckets up to 35 and 40 cu yd reflect the steady increase in capacity of stripping equipment that has done much to raise stripping efficiency in the bituminous coal industry 22.3% between 1942 and 1951, or from 13.10 tons per man to 16.02. A similar increase has been marked up in anthracite, this in spite of the fact that in both industries there has been a sharp increase in the average thickness of overburden handled. Larger buckets, higher lifts and longer ranges also have made their mark in areas largely operating with the smaller units. In Pennsylvania, for example, tons per man in stripping rose from 9.78 in 1941 to 12.82 in 1951, or 30.5%. Ohio increased tons per man in the same period from 13.36 to 17.06, or 30.5%. The key is that higher-capacity equipment normally requires no more labor—coal's costliest item—than lower-capacity equipment.

Cutting Stripping Cost



More Hole per Hour

This drill, one of several new types for both vertical and horizontal drilling, has demonstrated in actual operation ability to cut drilling manpower 79%, drill 2,000 ft of 10⅝-in hole in two 7¼-hr shifts, permit drilling and shooting over 61,000 cu yd of overburden in two shifts, and permit a new dragline to move 1,023,000 cu yd of overburden in 26 24-hr working days in 1 mo. At the same time, it permitted a significant reduction in explosives requirements per cubic yard. Thus, the net effects of this and other new units are (1) less labor for drilling, (2) less explosives per cubic yard, and (3) a significant increase in yardage moved by the stripping unit as a result of better bank preparation.

Building Yardage

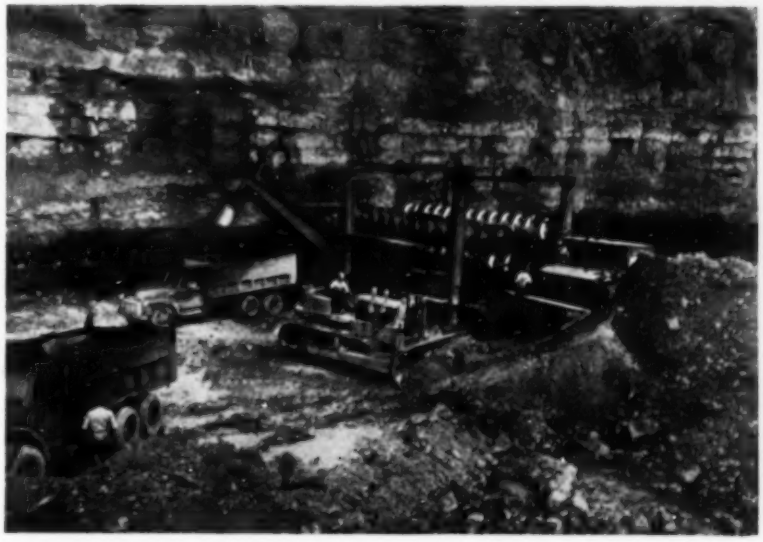
More capacity in service equipment, such as this bulldozer, enables service units to increase their contribution to the performance of the main stripping units. In addition, higher capacity makes it possible for tractors to pull larger and larger scrapers for supplementary service or for the complete stripping job, and also enables them to strip themselves with high efficiency at a number of operations.

70 Tons per Trip

One driver moves 70 tons per trip with this new haulage unit combining a semi-trailer of lightweight high-strength alloy and a 400-hp diesel engine with torque converter. Compared to 30-ton units in the same pit, it racks up 50% more ton-miles per hour of operation. Bigger engines and larger bodies in straight trucks are providing similar savings in both coal and spoil haulage in strip operations. The torque converter makes for smoother operation, less lugging and lower maintenance.

New Stripping Horizons

By adopting standard underground units or such new equipment as the big auger, strip mines now can extend recovery substantially when the highwall limit is reached—and with high efficiency. The auger shown is drilling 52-in holes 210 ft deep. With a four man crew, it produces better than 560 tons per shift.



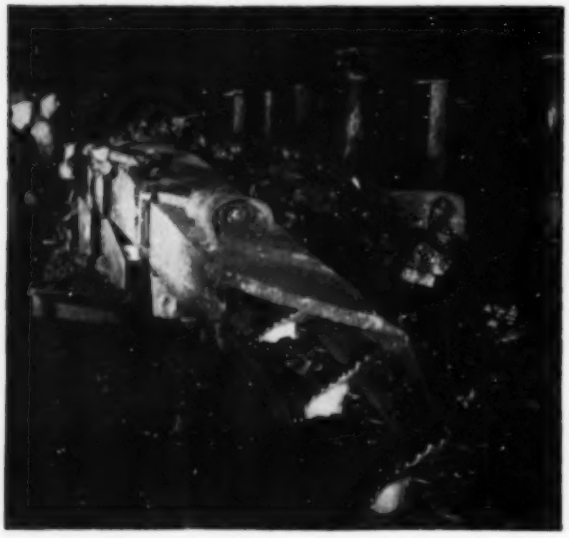
Raising Efficiency

Continuous Transportation

Although hand-loaded conveyors—chain, shaker and, infrequently, belt—commonly are included in machine-loading equipment, they really are transportation units. Their field, originally much broader, is now more and more in thin coal where they raise tons per man by providing continuous transportation, and also save by eliminating some of the things that would have to be done to get mine cars to the face. Properly used, they can increase efficiency materially. Example, 15 tons per faceman in 24- to 46-in coal in one mine with bad roof.

Loading Plus Transportation

Developed by the Union Pacific Coal Co., the duckbill made the shaker-type conveyor a loading machine, with consequent increase in capacity and in tons per crewman. Power swing in recent years enhanced capacity while reducing manual effort. Though used in all thicknesses of coal, the duckbill and companion conveyor provides a mechanized-loading system for thin seams.



Power Loading

Marked by progressive increases in capacity since the first machines were introduced more than 50 yr ago, the mobile loader began to hit its stride in the early 20s, and has been, with stripping, the main reason for the steady increase in tons per man since that time in the bituminous field. Models now are available for seams as thin as 36 in. In coal 4 ft or thicker, mobile loaders frequently produce over 500, 600 and 700 tons per shift with crews of as few as 10 men, though 12 to 18 is more common.

In Face Operations

Continuous Mining

Thanks to improvements in metallurgy making possible bits that can take it, machines that can mine coal as well as load it now are taking over more and more of the production job underground. Their history goes back to the Stanley header imported from England and first used in Colorado in 1888. As noted earlier in this Special Report, continuous miners, with their ability to produce in actual operation up to 75 tons or more per man on the crew, are now making it possible to match efficient strip operations in overall tons per man.

Longwalling

Now getting into action in the United States, continuous-mining units of the planer, cutter-loader or other types hold out good prospects for high efficiencies, particularly in the thinner seams. The first full-scale planer test, for example, showed, in 34-in coal, an average output of 13.0 tons of raw coal per manshift, both development and mining, including the training period, compared to 10.9 tons with conventional methods. Even-better performances are expected from the additional units now going into service.

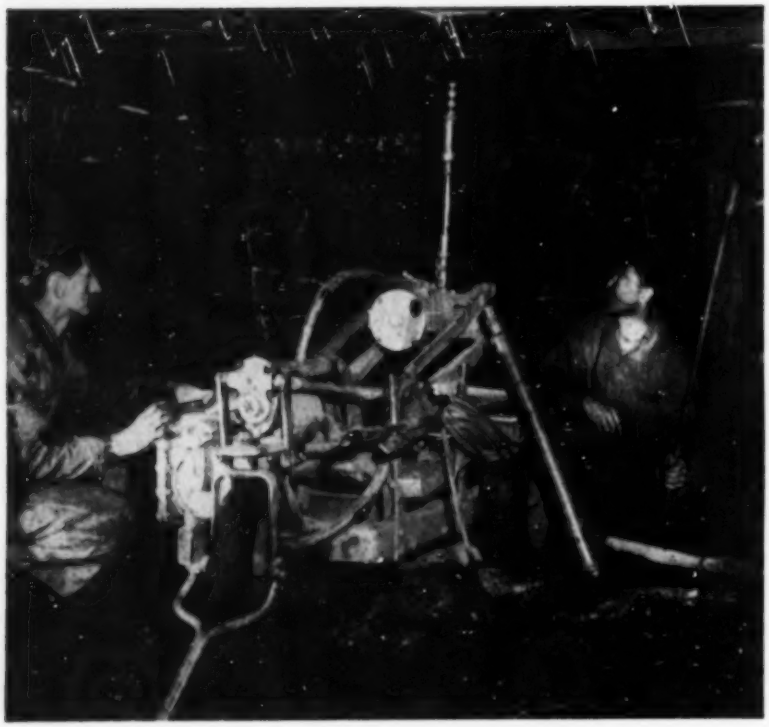
Remote Mining

The longhole drill for pitching seams, the big auger and the remotely controlled mobile miner now are opening the way to production of a substantial tonnage of coal without men going to the face—and with high efficiency. The remotely controlled mobile miner has shown its ability to go 690 ft, with 1,000 ft or more considered perfectly feasible, and has produced up to 6,000 tons in a 7-day week with 37 men per week on the payroll, including supervision. This means more than 30 tons per man delivered to the preparation plant or raw storage pile.

Ample Coal For Maximum Loading

Without coal to work on, no loading device can produce. And if the coal supply is insufficient, the loader has to work at a reduced rate, with consequent adverse effect on efficiency and cost. The capacity of cutting and drilling machines therefore should be more than enough to provide all the coal a machine can possibly load. The key with these and other units is clearing the way for maximum loading. Only thus is it possible to obtain averages of up to 700 tons or more per unit per shift with a minimum of manpower. As an example of what modern units can do, this hand-held hydraulic drill cut direct drilling cost 10 to 15c per ton at one mine, enabled loading units to perform more efficiently, and made possible a shooting method adding materially to realization by reducing production of fines.

Low-Cost Services—



Making Roof Support Pay

Protection of men and equipment is of course the fundamental reason for roof support in mining. Aside from that, it has been a necessary expense from which little or no direct return could be secured in the past. Now, however, a new system of roof support—roof-bolting—not only provides greater protection but in many instances enables face equipment and facemen to produce at a higher rate by preventing the time loss and interference involved in conventional timbering. Thus support becomes a machine process, and modern units permit crews of two men to keep up with loading machines cleaning up 12, 15 or more places per day. In a number of instances, bolting has permitted increases of 50 to 100 tons or more per machine per day by making it easier to maneuver and travel, in addition to preventing interruptions from falls. And where conventional crossbars are used, timbering machines, or even hand-powered hydraulic setters, reduce labor up to 50% or more.

Continuous-Flow Room Haulage

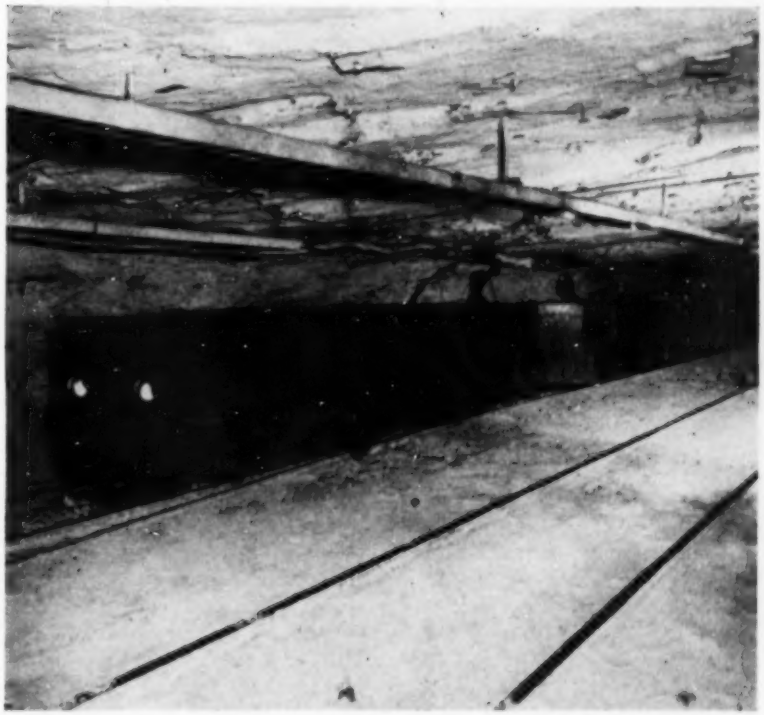
On track, it's the big mine car or the trackmounted transfer car; off track, it's the modern shuttle car, bridge conveyor, cascade conveyor, articulated conveyor, extensible conveyor (shaker or belt), or other unit, including a saddle-type transfer conveyor permitting a 200-ft advance merely by pulling a fully assembled room conveyor forward, that provides continuous or nearly continuous transportation behind loading or mining units, with the pickup loader behind continuous miners as another addition to the transportation ranks. The continuous or practically continuous flow provided by these units permits raising loader or miner tonnage up to 50% or more, with corresponding increase in tons per man.

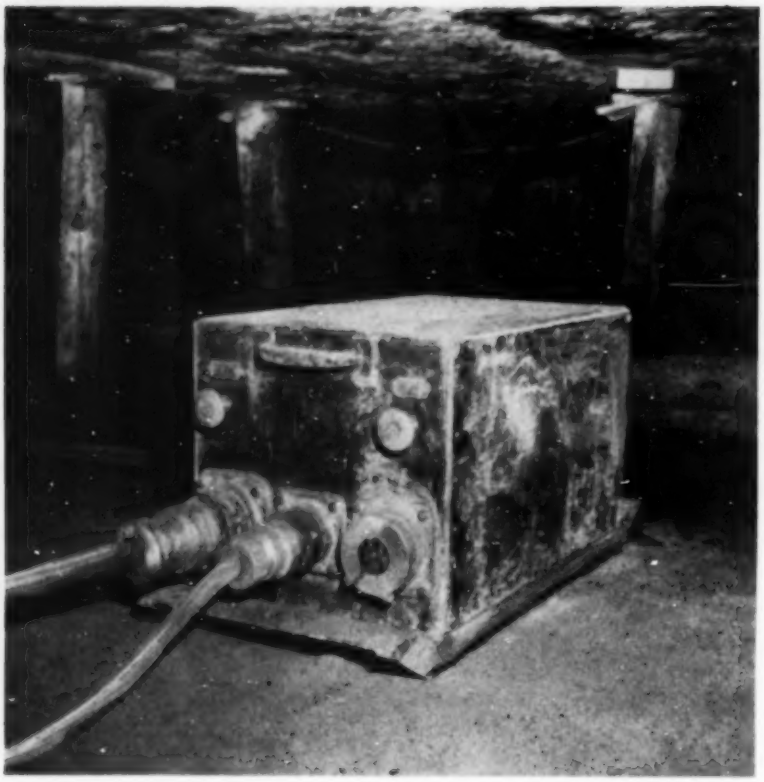
Better Face Performance

Low-Cost Haulage And Hoisting

Example—Single three-unit locomotive replaces 4 to 5 single units and, in conjunction with a new belt slope, 9-ton cars and other mainline improvements, including block signals and electric switchthrowers, enables two men to deliver 4,500 tons per shift to the bottom, against 8 to 10 men delivering 3,400 to 3,500 tons previously with a shorter haul. From the bottom, two men handle dumping and hoisting, compared to nine men with the old steam hoist.

In addition to this and other examples of how modern haulage equipment, which now includes special car and triphandling facilities (some completely automatic), mines which still must rely on shafts can now get automatic hoists that run without attendants. Modern haulage and hoisting facilities, in addition to their direct benefits, also raise the performance of face units by breaking haulage and hoisting bottlenecks.





Power, Water and Air

With DC equipment, motor and machine speeds drop almost in direct relation to drop in voltage below nameplate rating. AC equipment also is affected by low voltage, while in both instances low voltage means heating and increased delays as a result of electrical failure. The remedy is substations with ample capacity as close to the working sections as feasible. Auxiliaries that save manpower and reduce delays are modern sectionalizing equipment, grounding equipment, and junction and distribution boxes with the necessary circuit-protection equipment.

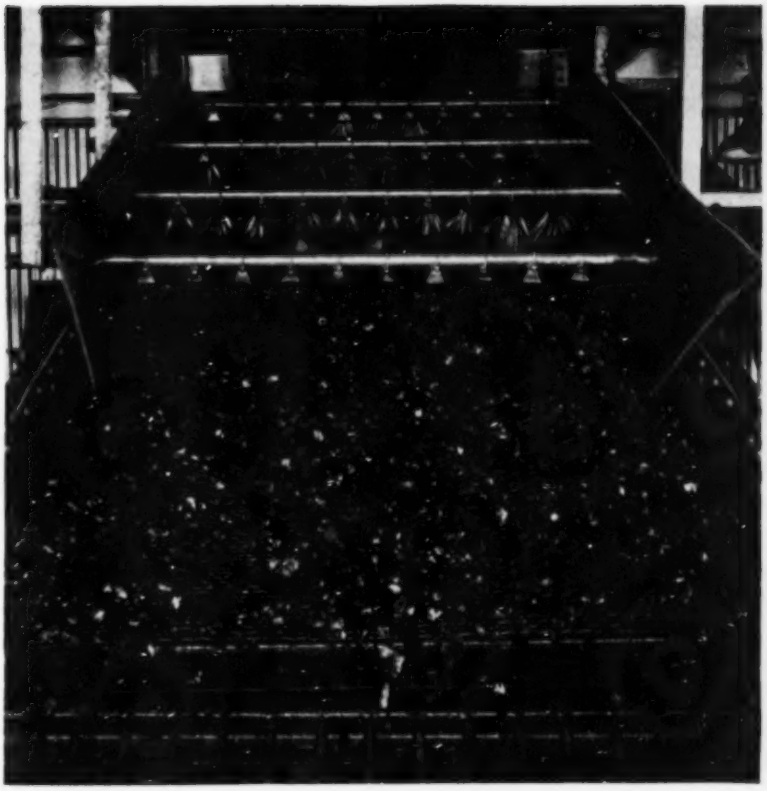
Modern pumps and fans handle more air or water with less horsepower. All can be equipped with automatic controls that reduce the need for attendants or eliminate them entirely.

Maintenance And Supplies

Maximum efficiency and lowest cost reflect, in addition to other factors, an absence of delays resulting from mechanical and electrical failures, as well as facilities for making repairs quickly when failures do occur. In other words, maintenance is a key activity, and involves keeping an adequate supply of repair parts at points where they are most needed. This in turn is one function of the supply system. Equipment for reducing labor and facilitating maintenance and supply work ranges all the way from mobile cranes on the surface to small monorail hoists underground for transferring supplies from rail cars to rubber-tired delivery equipment. It includes adequate shop equipment, as well as shops themselves (including service shops close to the working sections), machine carriers, welding and maintenance trucks, lubricating systems and equipment, and so on, with, of course, spare production units to replace quickly those that may break down or are withdrawn for overhaul.

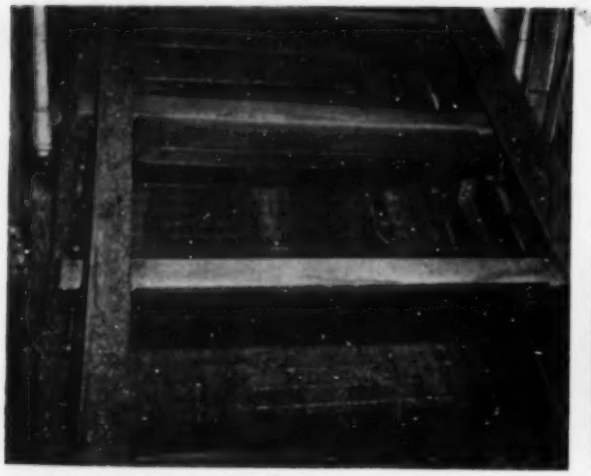
Cutting Preparation Cost

The steady decline in the number of men required to operate preparation plants is definite evidence that costs can be cut along with a real dividend in well-prepared coal. A number of plants running up to 3,000 tons per shift are now operated by as few as two men, one to oversee loading and the other at a master control panel. At the same time, use of modern materials and lubricating systems sharply reduces maintenance labor. The mechanical cleaner, of course, is the major factor in manpower conservation through the elimination of hand picking, along with such devices as the rotary breaker for rough cleaning, automatic sampling units, centralized controls and the like. Modern preparation facilities also cut costs by reclaiming for market coal that otherwise would go to the refuse dump.



Modern Mining Auxiliaries

The range of equipment now available for cutting mining cost includes a wide variety of items and is growing day by day. For example, this cartridge-powered tool is one of several varieties that provides almost instantaneous mounting of studs and bolts for trolley hangers, brattice cloth, stretcher cases, switch bases and a host of other items in steel, wood, concrete and mine roof and ribs. Other examples of equipment in addition to that listed previously that has proved its ability to cut cost and thus make money in mining are: track cleaners, automatic doors, trolleyphones, automatic couplers, bolthole cleaners, liner plate for slopes and shafts, automatic trip makers and feeders, power-operated refuse gates, modern refuse trucks and tramways, refuse pumps, rotary and sectionalized bins for parts, card-index systems, mechanical payroll computers and so on.



MONEY-MAKING METALS include stainless steel, here providing savings in dewatering service.

ACIDPROOF MATERIALS include this plastic borehole column. Light weight makes for easy installation.

COATING MATERIALS make stoppings airproof, as shown, and protect mine roof and structures from weathering.

HIGH-STRENGTH ALLOYS cut weight of 75-ton semi-trailer and provide corrosion and abrasion resistance.

Modern Mining Materials

A treated tie will last 7 to 10 yr or longer, in most mines, whereas an untreated tie will have a life of only 1 to 3 yr. With treatment, therefore, only one tie need be purchased in 7 to 10 yr, against an average of 3 or 4 untreated units in the same period. When the labor cost of 2 to 3 or more replacements is considered, the saving becomes a really handsome figure.

A plastic, wood, asbestos-cement, aluminum or other anticorrosive pipe line will last practically indefinitely, whereas acid water often will destroy carbon-steel line in a year or less. Again there are major savings in buying new pipe and in the labor of installing it. And with lighter pipe weight and improved quick couplings, even the original line can be laid in a fraction of the time required with conventional joints.

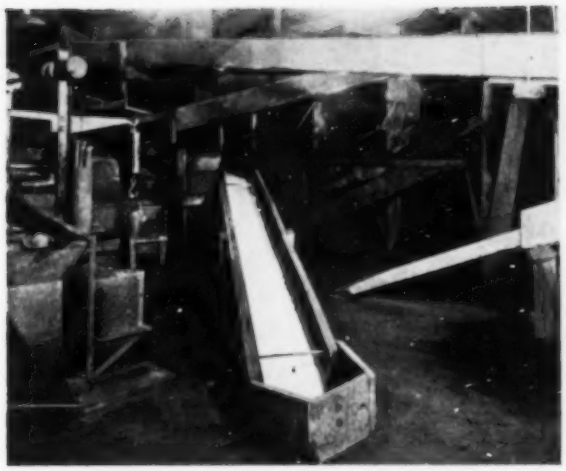
Plastic sheeting makes a temporary stopping that is as near airtight as possible and can be installed in a matter of an hour or two under most conditions. In addition, the sheeting is fairly easily reclaimed for use a second or more times.

Replacement of forged cutter bits with tungsten-carbide-tipped bits at one mine permitted transferring two men to general maintenance and also reduced bit changes at the face. With these and other advantages, the overall savings are estimated at 5c per ton.

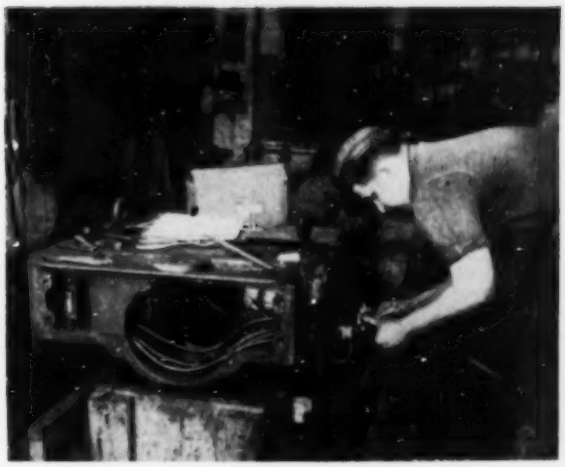
The foregoing are only a few of the numerous examples of savings achieved by modern materials, which last longer, increase machine operating time, reducing changing and replacement labor, and conserve materials. Other examples are as follows:

1. Stainless and alloy steel and aluminum for strength, light weight and corrosion resistance. In mine cars, truck bodies, cages and skips, stripping dippers and so on, reduced weight permits greater loads with the same or less power, in addition to resistance to corrosion. In screening, these materials and others—bronze, manganese and the like—resist corrosion and wear and provide more accurate screening with less blinding.

2. Alloy steel and hardfaced and tipped cutter and drill bits.

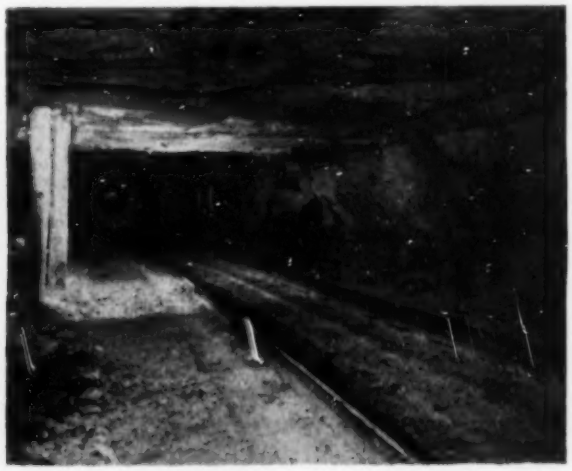


ABRASION-RESISTING MATERIALS—glass and others—lengthen chute and structure life and cut maintenance.



MODERN INSULATING MATERIALS prevent electrical failures and reduce repair costs.

LONG-LIVED BITS cut better and save time for production by reducing number of changes.



TREATED TIES LAST 3 to 4 times longer, or more, and make for haulage efficiency.

Save Time and Money

3. Hardfacing materials for wear points in mining equipment.

4. Special alloys, bronze, rubber and other corrosion- and abrasion-resisting materials for pumps, valves, fittings and other equipment handling water or wet material.

5. Rubber, tile, sprayed sand-cement and other corrosion- and abrasion-resisting materials for tanks and storage bins.

6. Glass, stainless steel and other materials for chutes, conveyor bottoms and similar applications.

7. Lime for neutralizing acid water in preparation.

8. Resin-impregnated paper for flumes—light weight, easy installation and long life.

9. Aluminum, protected metal and other weather-resistant siding and roofing for preparation plants and other structures.

10. Protective paints and coatings for plants and buildings.

11. Silicone, asbestos and other long-lived heat-resistant insulation for electrical equipment.

12. Plastic tape for electrical maintenance.

13. Improved heavy-duty lubricants and hydraulic oils.

14. Specially constructed high-strength wire ropes.

15. Plastic and bituminous-base sprayable materials for airproofing stopings, sealing roof and protecting surface structures.

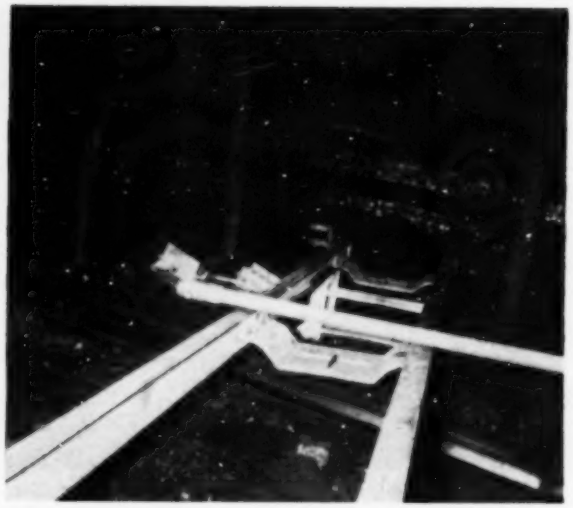
16. Calcium chloride and other compounds for allaying dust and conditioning shuttle-car and truck roads; calcium chloride solutions for vehicle tires to increase weight and drawbar pull over water filling.

17. Soil-solidification materials to facilitate work in soft or wet strata.

18. Grouting to seal off water flow into underground workings.

19. Sprayable metals to facilitate shaft buildup and other repairs; also as a protective coating for conveyors, cars and the like.

20. Wood for roof pinning and other services, including hardwood bearings for service under water—for example, installed in settling-tank conveyors.



T-SHAPED PROJECTIONS at ends of trough section, as pointed out in left photo, fit into cross-shaped cut-outs in carrier-frame stirrups (right photo). Trough sections merely rest in carrier frames and are not subjected to shaking forces.

BEARING RECESSES in low-type supporting stand keep bearings in alignment to reduce conveyor-line friction.

CONVEYOR PARTS are adaptable to any conventional drive unit through specially-designed frame.

CHARLES GELSO, owner, No. 14 Coal Co., looks for higher efficiency with new unit.

FRED JONES (left), foreman; Phil Gelso, superintendent, and Mike White, foreman, put the new conveyor through its paces.

ONE MAN can pick up and walk away with a 6-ft-long aluminum trough section weighing only 60 lb.

CARRIER FRAME rides atop roller bearings set into top of supporting stand, which is also aluminum alloy.

How new materials can help to increase efficiency is demonstrated by . . .

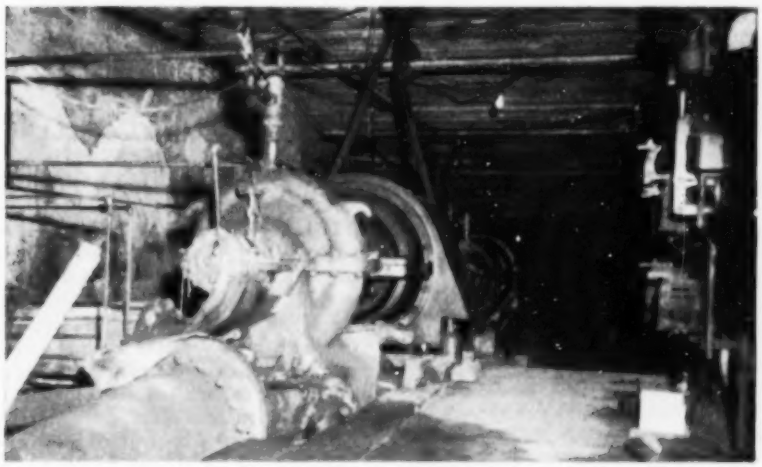
Aluminum Shaking Conveyor

New lightweight conveyor parts permit single-drive operation of longer lines or multiple lines, are more easily handled by the men, resist the corrosive effects of acid mine water and are easily assembled.

By HAROLD DAVIS
Assistant Editor, Coal Age

IF THE USE of new and different materials can help reduce power requirements, decrease the labor involved in materials-handling or get longer service from equipment made of the new materials, then these new materials are worth a trial as a definite cost-cutting opportunity. That's what Charles Gelso, owner, and his son, Phil, general superintendent, figured when they went to the use of aluminum-alloy shaker-conveyor parts in mining anthracite at their No. 14 Coal Co., Port Blanchard, Jenkins Township, Pa.

The new Holzworth conveyor, powered by a 10-hp Goodman drive unit, includes a cross-conveyor, a gathering conveyor and one or more chamber conveyors, all operating from the single drive unit through bell cranks. The shaking force is transmitted through carrier frames made of aluminum-alloy I-beams; the trough sections merely ride in the carrier frames and are not subjected to the shaking force. The carrier frames in their back-and-forth motion ride on roller



FOUR PUMPS like this, 11,000 gpm total capacity, are required to keep ahead of the water problem.

bearings set into the tops of supporting frames, which also are made of aluminum alloy.

The company, which assumed operation of the mine in 1949, is recovering coal from large pillars in the Pittston, Checker, Diamond and Marcy veins in property leased from Pennsylvania Coal Co. The coal is cleaned at Pennsylvania's Underwood breaker.

The main opening is a 3-compartment shaft with one compartment reserved for men and supplies and the other two for hoisting coal and rock. As in other anthracite mines where the first mining was done long ago, the gangways at No. 14 generally follow the contours of the moderately pitching beds. Inside slopes, driven to the dip, connect the gangways which are driven along the strike, and mine cars are hauled on these slopes by 200-hp electric hoists.

THE ALUMINUM CONVEYOR

The Marcy-vein workings, where the new lightweight conveyor is in service, pitch about 45 deg. The vein is about 8 ft thick, including the several rock partings shown in the illustrations. The rock is gobbed in packwalls along the right rib of each place as it is driven.

About 90% of the 800 tpd produced from all veins is transported either on chain or shaking conveyors. The remainder is produced in development work, the gangways being driven by hand-loading-into-mine-car methods.

The drive unit and gathering conveyor are installed in the airway and the conveyor is extended as the airway is advanced. A cross-conveyor, operating through a bellcrank, transports the coal from the gathering conveyor to the mine cars in the gangway.

Chamber conveyors, also operated by bellcranks attached to the gathering conveyor, are used in opening up the chambers and driving them the projected distance.

HOW THE CONVEYOR IS MADE

Trough sections are made in 6-ft lengths, each weighing 60 lb. Carrier frames are 18 ft long and weigh about 180 lb; supporting stands weigh less than 50 lb. At the time the mine was visited, all trough sections were 17 in wide, but officials of the company were expecting a shipment of 23-in-wide troughs to be used in the gathering line.

Carrier frames are fastened together with two ⅞-in bolts at each end to extend the conveyor line as the working place is advanced.

Here's how the troughs are fixed to the carrier structure. At the end of each trough is a T-shaped projection extending below the bottom of the trough. This projection is designed to drop into cross-shaped cut-outs in spacing stirrups between the two rails of the carrier frames. The stirrups are 6 ft apart along the length of the carrier frame. The projections of two troughs fit into the cross-shaped opening in the stirrup, thus imparting the motion of the carrier structure to the troughs without subjecting them to the full force of the stroke. This manner of fastening the troughs also insures their lateral stability in the line.

HOW THE CONVEYOR IS USED

At No. 14, each conveyor crew consists of three men, two at the face and one at the loading point. They work together in getting the carrier frames into position during lapses in the regular face cycle; for example, while waiting for the smoke and fumes of blasting to clear. The troughs and supporting stands can be handled by one man.

In disassembling the conveyor prior to moving to a new setup, the parts are removed from the inby end of the conveyor and moved toward the drive unit by the action of the conveyor itself. Removing 12 bolts from the carrier structure, after the troughs have been lifted out, disassembles 108 ft of conveyor, for example.

The conveyor parts are made of a patented aluminum-zinc-magnesium-chromium-titanium alloy called 40-E by the manufacturers, Frontier Bronze Co., Niagara Falls, N Y. Tests show a yield point of 28,250 psi and an ultimate tensile strength of 35,000 psi. Furthermore, No. 14 officials feel that the corrosion-resistance of the alloy will bring additional benefits in wet places.

The conveyor now is in use in the second setup, and the goal is to operate about 600 ft of conveyor line and four bellcranks from the single drive before it is moved forward to the next drive position in the mining plan.

The 600 ft would include 50 ft of cross conveyor between the gathering conveyor and the loading point, 125 ft in each of two chamber conveyors, 50 ft of conveyor to drive the crosscuts between adjacent chambers and 250 ft of gathering conveyor. The crosscut conveyor and bellcrank may be drawn along through the crosscut as each succeeding chamber taps into the crosscut. And the bellcranks of conveyor sections not in use may be disconnected to reduce the load on the drive unit.

In the section now being worked, chambers are driven 25 ft wide on 55-ft centers; crosscuts are 10 ft wide on 60-ft centers. The coal is shot off the solid after being drilled with Ingersoll-Rand percussion drills and Thor rotary drills, both air-operated. Kennametal bits are used with the Thor units, and only permissible explosives are employed.

The mine employs 260 men and produces about 800 tpd in two shifts. The 3-man face crews in Marcy-vein conveyor mining are producing an average of 10 3-ton cars per shift.

Another step taken by Mr. Gelso in his efforts to reduce the cost of operations is the conversion of the main shaft hoist from steam power to electricity. A 400-hp motor recently was applied to the hoist, thus eliminating the last need for colliery steam.

Like other anthracite operators, Mr. Gelso finds these cost-control steps are necessary in view of the existing water problem. The company must maintain a pumping capacity of more than 11,000 gpm in four bronze-fitted centrifugal pumps with drive motors aggregating 1,550 hp, so economy measures in the other phases of coal recovery are a prime concern.

Thriftiness in the Use of Energy . . .

HAVE YOU EVER THOUGHT of coal mining as an investment of energy to accomplish a desirable end—the production of coal? It's as simple as that. As an operator or supervisor, you and your men abide by an agreement which stipulates how much you pay them for their skills and muscular energy. But to get the job done most efficiently, human energy is most economically applied in controlling other forms, such as heat, chemical, mechanical or electrical energy.

You get maximum efficiency in using these forms of energy when you:

1. Define the job to be done and plan your working places to permit maximum use of these forms of energy.

2. Investigate the cost balance among the various forms of energy to permit most economical operation. (For example, you should know whether the electrical energy required in continuous mining really will be more economical than the chemical energy in explosives.)

3. Prevent waste of the useful energy. Wasted energy is a double loss. You have already paid for it and you get no realization from the coal it might have mined.

NEW 110-TON BORING UNIT, cutting a 15x15 opening, is expected to complete 2,800-ft slope, on 15½ deg, in 9 to 14 mo.

Continuous Slope Sinking

SCALED UP from smaller equipment used in driving slopes for the Orient No. 3 mine, in southern Illinois, a continuous slope-sinking machine of the boring type went into operation at the site of the new No. 22 mine of the Jamison Coal & Coke Co., Fairview, W. Va., early in June. Equipped with three cutting heads, the machine will make a 15x15-ft opening and is expected to complete the 2,800-ft slope, on an inclination of 15½ deg, in 9 to 14 mo.

The 110-ton machine was developed out of the experience of Kenneth M. Rodenbush, who has the contract for the No. 22 slope; his associate, Wilbur Robbins; and the Jamison Coal & Coke Co. Messrs. Rodenbush and Robbins gained their first experience with equipment of this type in sinking Orient No. 3.

The unit was custom-built in a shop at the site of the No. 22 slope. The three revolving cutting heads are supplemented by chains to "square off" the sides, and the top and bottom, leaving an arched opening. All the rotors and cutting chains are driven by a single 150-hp motor, with smaller motors for the conveyor, the hydraulic pump and the gathering head.

Some 300 tungsten-carbide-tipped bits are employed in the various cutting elements. Speed of advance in hard sandstone is expected to be 5 ft per shift and several times that in softer material. The machine rests on shoes and is held in working position by jacks. A hoist and 10-ton car will remove the cuttings to the surface.

Some 300 ft of the initial length of the slope will be concreted, after which protection will be provided by roof-bolting and guniting. The belt to be used for hoisting will be suspended in the top of the slope, leaving room beneath for tracks and other facilities. The mine also will be served by a man and supply shaft and a separate air shaft.

M. F. FETTEROLF (left), owner, and C. E. Buchanan, superintendent, supervise stripping and cleaning set-ups.

M. F. Fetterolf, 32-yr-old coal operator, believes his future in the coal business will be bright if he keeps in step through constant modernization of his facilities to hold his present markets and seek new ones.

Starting on his own 13 yr ago, at the age of 19, Mr. Fetterolf certainly thus far has proved his point. Here's how he teams . . .

MULTIPLE CIRCUITS in this three-track and truck-service plant permit double screening for a variety of sizes.

STAND-OFF VIEW of plant shows truck-fed picking and crushing unit (right) and main sizing-and-loading plant.

Efficient Stripping and Flexible Cleaning

THE DAY OF OPPORTUNITY has not passed in the coal industry. Proof of this lies in the story of M. F. Fetterolf, owner of the M. F. Fetterolf Coal Co., Boswell, Pa. At the ripe old age of 32, Mr. Fetterolf has succeeded in putting together a going concern in the business of strip-mining and cleaning about 200,000 tons of coal a year from the E and C-Prime seams in Somerset County, Pennsylvania. Furthermore, Mr. Fetterolf did not inherit a ready-made windfall. Without fanfare, and only in answer to our questions, he related that he was born and reared on a farm in Snyder County, Pennsylvania; that his formal schooling ceased after 1 yr of high school, and that his first business venture was the purchase of a used International truck in 1940. He was 19 yr old at the time.

That's how it started, but to an energetic young fellow the *status quo* is never satisfactory. Come 1944, he had 13 trucks, some of them in strip-mine haulage in the Philipsburg, Pa., area. In 1944, the trucks were sold and Mr. Fetterolf purchased a second-hand Lorain 75 shovel which he used on contracts from other strip operators. Then 4 yr later, after having acquired more equipment, Mr. Fetterolf moved to the Boswell area and was on his own.

Incidentally, if you have need of an International truck, Mr. Fetterolf will be happy to provide one. His most recent venture has been the acquisition of the International sales-and-service agency at Bedford, Pa.

THE FETTEROLF PRODUCT

Through a combination of complete cleaning of the surface of the uncovered coal and careful picking and sizing, the company is able to produce coal with analyses in three representative sizes as shown in the accompanying table.

The samples were taken at the loading booms and chutes of the cleaning plant in compliance with Bureau of Mines sampling methods and the analyses were run in a commercial laboratory. The entire output is handled through the sales and distribution facilities of the Calvert Coal Co., Baltimore, Md., and is primarily used as an industrial fuel. S. J. Sherwood, a Calvert coal inspector, spends most of his time at Boswell to sample the uncovered coal and help supervise the loading schedule among the four stripping sites.

Right now, Mr. Fetterolf is planning the addition of a Chance-process preparation plant to broaden the field in which the company may bid its product. Tests show that if the coal is washed it will be suitable for metallurgical use.

Here's how the company goes about its major functions of mining and cleaning the coal, and reclaiming the stripped land.

RECOVERING THE COAL

As mentioned, four stripping sites are now active within a 5-mi radius of Boswell on lands owned outright by the company and leased from others. Stripping and loading equipment consists of five draglines and five shovels. The draglines are a 6-yd Manitowoc 4500, a 2½-yd Manitowoc 3500, a 3-yd Link-Belt K595, a 4-yd P&H 1055 and a 2-yd Lorain 820. The shovels are a Bucyrus-Erie 38B, a Lorain 79, a P&H 655, all 1½-yd; a 1-yd Lima 34 and a ¾-yd Link-Belt LS85.

Three of the pits are in the 42-in E seam (Upper Freeport) and the other is in the C-Prime seam (Upper Kittanning) which runs from 6 to 8 ft thick. The combined operations in the E and C-Prime seams have a minimum life expectancy of about 20-yr.

Average depth of overburden is from 40 to 50 ft, although in some places it is taken to a depth of 70 ft. The 6-yd dragline now is stripping the E seam in such an area.

In opening up, the topsoil is removed and stockpiled, the softer overburden is pushed into the spoil area beyond the outcrop and a level working bench is constructed for the dragline by bulldozers from a company-owned fleet which includes five International TD-24's and three TD-18's. In each case, the dragline removes a 50-ft-wide cut of overburden along the length of the property.

For situations where the overburden is too hard for the draglines, a truck-mounted 6-in Cardox-Hardsocg drill is available to drill blastholes into the highwall. The horizontal holes are 50-ft deep on from 12- to 15-ft centers. The charge consists of about 200 lb of explosive per hole and the rounds are detonated through Primacord. Drilling and shooting is scheduled among the different pits to provide sufficient broken material ahead of each dragline for uninterrupted operation.

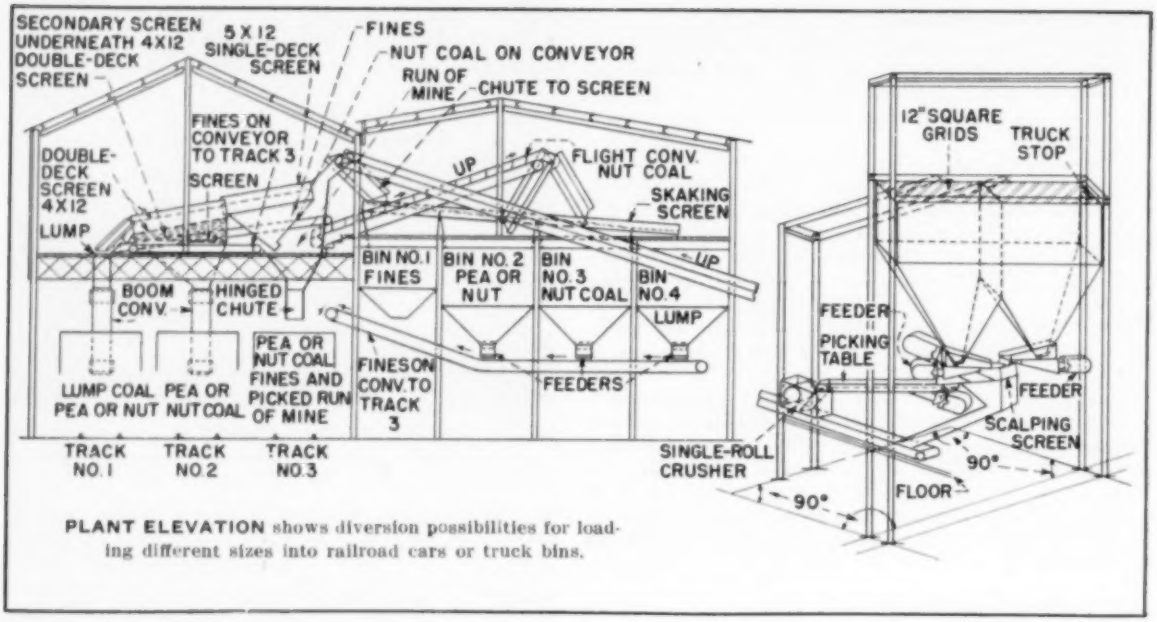
The surface of the coal is cleaned and a low-quality bench in the E seam is spoiled before loading commences. The stripping units work two shifts per day, 6 days per week; the loading units work one shift per day, 5 days per week. Average coal production is 1,200 tpd.

The coal is hauled from the pits to the plant by 14

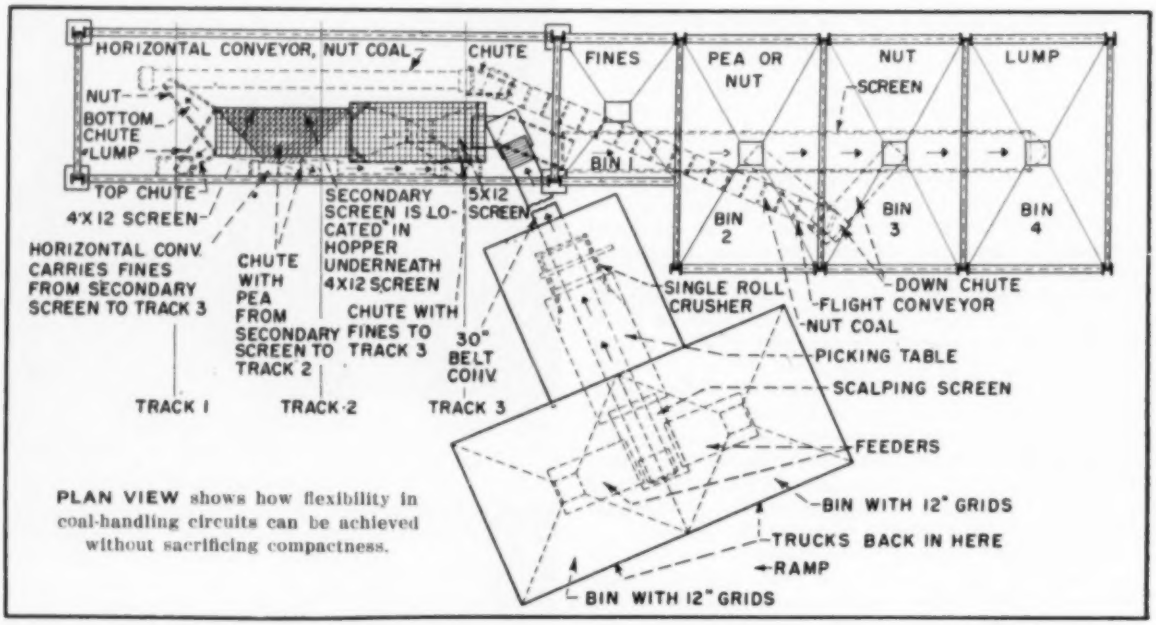
DIESEL-POWERED 6-YD DRAGLINE removes up to 70 ft of overburden to expose the 42-in Upper Freeport (E) seam.

COAL SURFACE is cleaned prior to loading out 50-ft-wide cut. Here a 1-yd loading shovel loads a 20-ton truck.

OPENING CUT into 8-ft-thick section of the Upper Kittanning (C-Prime) seam initiates a pit with a 20-yr life.



PLANT ELEVATION shows diversion possibilities for loading different sizes into railroad cars or truck bins.



PLAN VIEW shows how flexibility in coal-handling circuits can be achieved without sacrificing compactness.

trucks of 15-, 18-, or 20-ton capacity. In the matter of truck utilization, Mr. Fetterolf says he prefers to wear out the units in service, since the market for used trucks of this size is somewhat limited. Last February, one of the trucks, powered by a Cummins diesel, was laid up for its first complete overhaul after running up a total of 200,000 mi of operation.

For final recovery, the company employs a 32-in Cardox-Hardsocg auger which drills holes 80 ft deep under the final highwall.

CLEANING THE COAL

Among the outstanding features of the sizing and screening plant, which was designed and erected by Williams & Green, Clearfield, Pa., are built-in provisions for double-screening the ¾x1¼-in pea coal and for rescreening all bin-stored sizes before they are loaded into trucks. These features provide benefits for both producer and consumer —maximum flexibility in the plant and closely sized coal in the railroad cars or trucks. The plant is equipped with three loading tracks and four elevated bins for truck service.

Here's a description of the flow of coal through the Fetterolf plant, which is equipped in the main with Syntron vibrating units.

Trucks from the strippings dump the coal into either

SCALPING SCREEN (left), in the picking and crushing unit feeds plus 2-in lump to vibrating picking table. The scalping screen receives coal from two feeders with 12-step speed control to facilitate blending of raw coal.

SINGLE- AND DOUBLE-DECK vibrating screens separate various sizes for direct loading or bin storage.

TRUCK-SERVICE BINS are equipped with screen-feeders to speed truck loading and to remove degradation fines.

of two 60-ton bins which are covered with steel grids having 12-in square openings. A Syntron F-45 feeder at the bottom of each bin feeds the coal onto an F-65 scalping screen which discharges plus 2-in coal to an F-65 picking table. Both the underflow of the scalping screen and the hand-picked product of the picking table are transported on a 30-in belt conveyor to the sizing plant, after the lump coal has been crushed to minus 6 in in a single-roll crusher.

At the top of the sizing plant, the coal from the belt conveyor may be channeled to any of three circuits through the manipulation of a butterfly gate in the belt-discharge chute. The hand-picked coal may be directed to a Williams & Green shaking screen which splits the coal and discharges the separate sizes into the truck-service bins. Or the belt discharge may be loaded directly to railroad cars on Track 3 through a different arrangement of the butterfly gate. The third alternative is to channel the picked coal onto the single-deck 5x12-ft vibrating screen, as shown in the plan view.

The minus ¾-in underproduct of this screen is loaded directly on Track 3. The plus ¾-in overproduct is discharged to a 4x12-ft double-deck screen. The product of the top deck is 2x6-in lump for the loading boom at Track 1. The overproduct of the lower deck is 1¼x2-in nut coal, which is transported to the nut-coal bin by a

LAND RECLAMATION—Paired-off bulldozers push the spoil back into worked-out pits, then spread stockpiled topsoil over the site. Right photo shows a reclaimed area before the topsoil in the distance is spread.

Here's the Kind of Coal the Fetterolf Plant Produces

2x6-IN EGG	As Rec'd	Dry Basis
Moisture	2.00%	
Volatile matter	16.65%	16.99%
Fixed carbon	71.66%	73.12%
Ash	9.69%	9.89%
Sulfur	1.64%	1.67%
Btu	13,826	14,108
Btu (moisture and ash free)	15,656	
Ash-fusion temp.	2,680 F	
¾x1¼-IN PEA		
Moisture	2.50%	
Volatile matter	17.48%	17.93%
Fixed carbon	70.83%	72.64%
Ash	9.19%	9.43%
Sulfur	1.65%	1.69%
Btu	13,823	14,177
Btu (moisture and ash free)	15,653	
Ash-fusion temp.	2,660 F	
2-IN SLACK		
Moisture	3.30%	
Volatile matter	7.06%	17.64%
Fixed carbon	72.25%	74.72%
Ash	7.39%	7.64%
Sulfur	1.58%	1.63%
Btu	13,960	14,436
Btu (moisture and ash free)	15,630	
Ash-fusion temp.	2,720 F	

belt and an elevating conveyor or discharged from the belt at Track 3 to be loaded with the fines to make 2-in slack. The nut coal is primarily a truck-hauled product, but it can be diverted from the belt to Track 2.

Under the double-deck screen is another screen with ¼-in openings to remove degradation fines, thus providing a double-screened ¾x1¼-in pea coal for the loading boom at Track 2 or the chute at Track 3. The minus ¾-in fines are chuted to Track 3.

A further contribution to the flexibility of the plant is contained in the Syntron feeders at the raw-coal bins into which the run-of-mine coal is dumped. The feeders have 12 speeds, making it possible to blend in any ratio the feed to the scalping screen from the raw-coal bins.

Coal from the nut, pea and lump bins is discharged to trucks over Syntron F-45 screen feeders which take out the degradation fines. The underflow of these feeders is returned by a belt conveyor to Track 3.

By changing screen jackets and crusher opening and taking advantage of the flexible circuits in the plant, the company is able to make a variety of sizes, such as the following: 2x6; 2x5; 2x1¼; 2x1; ¾x1¼; ½x1; 2-in nut and slack; ¾-in slack, and ½-in slack.

RECLAIMING THE LAND

Fetterolf operations are not concluded until the farm land from which the coal is recovered is returned to its original contour and the topsoil is back in place.

As mentioned, the topsoil is stockpiled when the pit is opened. Shortly after the coal has been loaded out, a pair of 'dozers is assigned the job of pushing the spoil back into the pit and returning the cover of topsoil to the site. When the Fetterolf equipment leaves a property after the coal has been recovered, the land is ready for immediate cultivation. Within a few years there is little indication that the land has been stripped.

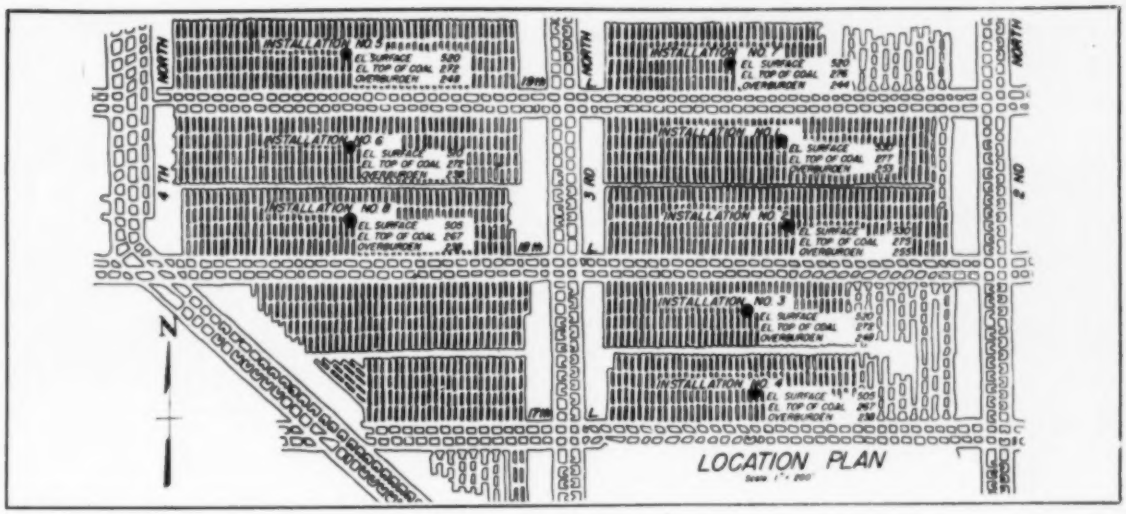
Assisting Mr. Fetterolf in the supervision of the company's operations are C. E. Buchanan, superintendent; Peter Sapolo, cleaning-plant superintendent; Jim Blackford, Fred Houston and Wallace Albright, pit foremen; Carl Halverson, office manager, and George Sabin, chief clerk.

★ ★ ★ ★ ★

WHO...

Who is wise? He that learns from everyone.
Who is powerful? He that governs his passions.
Who is rich? He that is content.
Who is that? Nobody.

—Ben Franklin,
As quoted in Safetygram.



WHERE CONVERGENCE STATIONS were located in the test section.

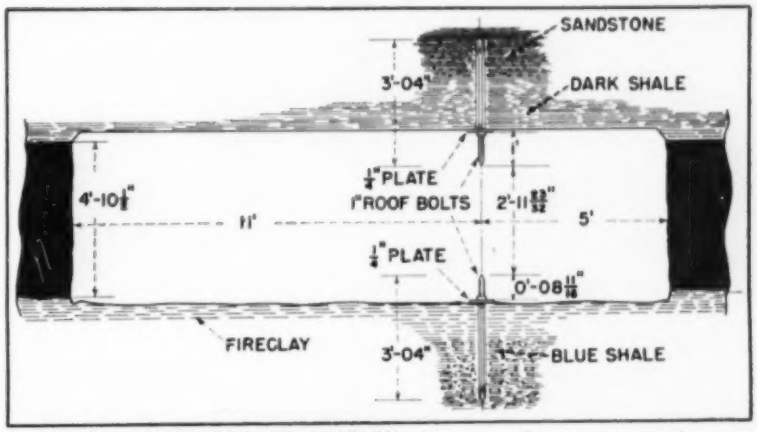
Modified Roof Bolts Make Convergence Detectors

WITH THE ADVENT of continuous mining in 1950 at the Gorgas (Ala.) mines of the Alabama Power Co. (June, 1952, *Coal Age*), the mining plan was changed to favor the new machines and at the same time increase coal recovery as much as possible. With the miners, rooms normally are driven 16 ft wide on 26-ft centers to a depth of 260 to 300 ft, with crosscuts on 65-ft centers. The goal in recovery in the rooms is 75%, and over complete room panels, 65%.

In developing the plan, it was necessary to give consideration to other coal beds above that might be mined at some future time. Maximum extraction was desired but at the same time management also desired to provide reasonable protection for the overlying coal. To check on its conclusions that 35% in the panels would provide reasonable protection, it was decided to measure roof subsidence—or convergence of top and bottom, if any—at regular intervals.

Modified roof bolts were chosen for convergence detectors. The accompanying illustration shows a typical installation. The points of the roof bolts were ground conically to provide points between which measurements could be made. Eight convergence stations were set up at points shown on the accompanying map section. Twelve sets of measurements have been made with results as in the accompanying table.

Cover at the eight stations varies from 238 to 255 ft. Coal thickness ranges from 4 to 4 ft 9 in. The upper pins are anchored in the sandstone above the dark shale immediately over the coal; the lower pins are in the blue shale under the fireclay floor.



TYPICAL CONVERGENCE STATION—No. 1—in Gorgas test section.

Convergence Record, Gorgas Mines

Sta. No.	Convergence, Inches											
	1952 Date							1953 Date				
	5/22	7/15	8/15	9/15	10/15	11/17	12/15	1/16	2/2	3/2	4/1	5/1
1	0	0	1/32	0	0	0	0	0	0	0	0	0
2	0	3/64	3/32	1/32	3/64	1/16	0	0	0	3/64	0	0
3	0	0	1/16	0	0	0	0	0	0	1/64	0	0
4	0	0	1/32	0	0	0	0	0	0	0	0	0
5	0	0	1/16	0	0	0	0	0	0	1/32	0	0
6	0	0	1/16	0	0	0	1/16	0	0	0	0	0
7	0	0	.*	.*	0	1/32	0	1/32	0	0	0	0
8	0	0	1/32	0	0	0	0	0	0	0	0	0

*Observations interrupted to straighten bottom pin, damaged by fall.

ORIGINAL KANAWHA CAR shown backing out of the Goldie Raye mine (left) and immediately after discharging its load to the dump hopper outside the portal (right). Powered by a 3-hp DC motor supplied by a drag cable, the car has a capacity of 1½ to 2 tons, depending on seam height or crossbar clearance. The two 2x6-ft doors are closed after dumping with a hand-operated windlass.

CAR ORIGINATOR is R. H. "Bob" Murrill, shown in his shop with a "Murrill low-vein shuttle buggy" under construction. At the right, cover on new buggy under construction is raised to show front axle pivot providing 3-point suspension.

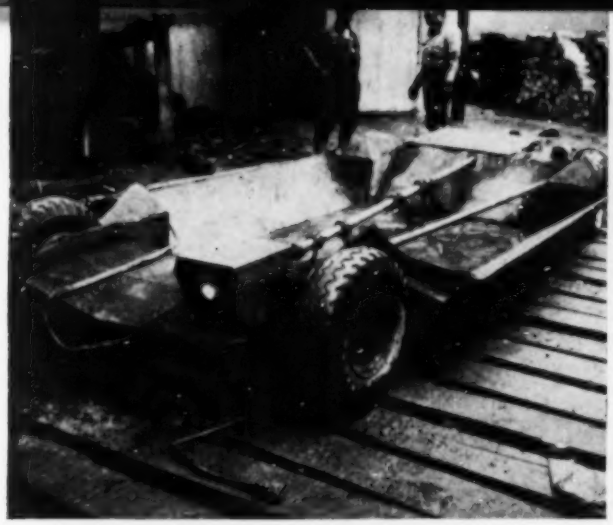
Dropbottom Cars From Autos

Developed locally for low-vein application, Kanawha-type shuttle cars powered by small AC or DC motors boost output at truck mines, in outcrop recovery and as gatherers in rail-shipping conveyor mine. Inverted trolley wires power supply cars.

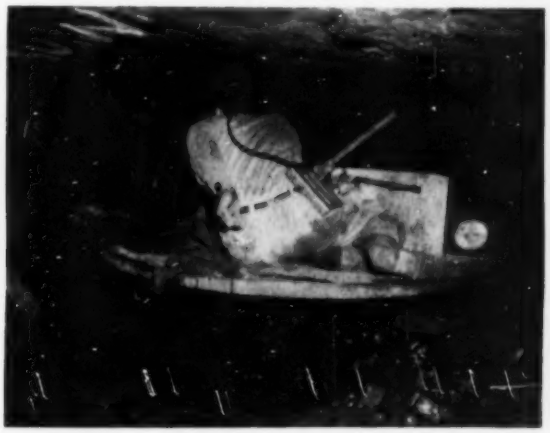
By J. H. EDWARDS, Associate Editor, Coal Age

ANOTHER DESIGN "ENTRY" among the small low-vein shuttle cars built with automobile parts is the "Kanawha Type" dropbottom unit originating in the Kanawha field of West Virginia. With nearly 50 built to date, the cars are an important factor in producing 12 tons per man underground at one truck mine, for example, and are serving as the exclusive gatherer in at least one sizable railroad-shipping mine, an operation mining around 10 tons per faceman in 32-in coal with a version revised to fit its requirements.

In the past several years considerable numbers of the "shopmade" shuttle cars driven by 2- to 7½-hp motors powered through electric cables dragged on the mine bottom have been put in operation in truck mines and in a few railroad mines in several coal fields, the actual design varying with the locality. End-dump units used in truck mines producing 10 tons per man employed with hand-loading and shooting off the solid in Floyd and Johnson counties, Ken-



COALBURGH-KANAWHA VERSION eliminates cross pipes to minimize interference with lump coal, relying on redesigned body for necessary strength. Pipe through center winds chain to close doors and pipe at side houses steering column. Later cars have light and steering gears under front deck. In car about to enter drift with supplies (right), the stationary drive axle is at the near end and the steering axle at the other.



UNDERGROUND in 500-tpd rail-shipping Coalburgh-Kanawha mine, cars operate in a 32-in seam on a bottom that is fairly hard and does not rut. At loading point (right), buggies dump into pit equipped with chain conveyor as feeder.

Serve Kanawha Mines

tucky, were illustrated and described in April *Coal Age*, pp 88-91.

NEARLY 50 KANAWHA CARS NOW IN OPERATION

The "Kanawha" design was worked out by a commercial welding shop, which has built nearly 50 of the units for truck and railroad mines. To suit its needs, the Coalburgh-Kanawha Mining Co., operating a rail-and-river-shipping mine nearby, changed the design somewhat and has acquired enough of the cars to handle its production of almost 500 tpd, building several of the cars in its own shop. The company utilizes a hexagonal-area mining plan to obtain maximum tonnage per loading-point setup and uses a double inverted trolley for powering the Kanawha-type supply cars traveling parallel to the belt on the main entry.

R. H. Murrill, who operates Bob's Welding Service, located at Chesapeake, on State Route 61 about 11 mi up the Kanawha River from Charleston, originated the Kanawha-type shuttle car, which possibly should be termed the "Murrill-type" car to distinguish it from the revised Coalburgh-Kanawha version to be described later in this article. Accompanying photographs show the "Murrill Low-Vein Shuttle Buggies," as he calls them, in the manufacturing shop and at the truck mine of the Goldie Raye Mining Co., on Cabin Creek, operated by R. F. Willis.

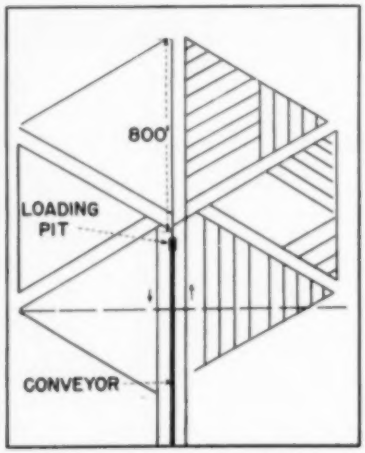
CONSTRUCTION SIMPLIFIED

In a sense, the buggy has no chassis since the welded steel body acts as a frame by virtue of a rectangle of pipes at the top. Total body length is 15 ft; width, 6 ft; and height, 22 in. The 6.50x10 10-ply tires are the highest part of the unit and its capacity is 1½ to 2 tons. There are no springs between the axles and body. Three-point suspension to handle unevenness of the roadway is obtained by a pivot over the center of the front axle. Automobile-type front axles, steering mechanisms, rear axles and differentials are used, with those from Dodge ½-ton trucks preferred. The two 2x6-ft dropbottom doors hinge at the sides and provide a 4x6-ft opening when

MURRILL BUGGY taking supplies into the Goldie Raye mine and with cover on cab end raised (right) to show 3-hp DC motor and torque-arm reducer.

FOR HANDLING SUPPLIES at Coalburgh-Kanawha mine, drag cable is replaced by a 25-ft cable and double-shoe glider operating on a pair of inverted trolley wires (left).

AT LOADING POINT, coal from buggies forms its own hopper and is fed to belt conveyor by 25-ft chain conveyor.



MINE PLAN at Coalburgh-Kanawha produces up to 80,000 tons per loading point, keeps pit cost low.

dropped. Door closing is accomplished with a hand-operated windlass which raises the doors by winding chains on a pipe extending along the top center of the car.

The operator is positioned at the end of the car supported by the driving axles, where the electric motor also is located, thus keeping all drive and control mechanisms concentrated at that one end. The steering column is a long rod passing through the side pipe of the body-reinforcing rectangle. The AC cars (220-v) are fitted with 5-hp single-phase (repulsion-induction) motors and, in a few instances, with 7½-hp three-phase motors (high-torque-type). For 250-v DC operation, the motor is a 3-hp unit. Motors rated 1,750 rpm or thereabouts are used.

Instead of incorporating an automobile transmission for speed reduction, the drive connection is a V-belt and Dodge Torque-Arm reducer. A clutch is not used and no speed selection is available. The brake is a band type on the drive shaft. The DC controller is a Flood City four-point Type AT unit and the headlights (110-v) are of the same make. A reversing drum made by Furnas Electric is used on both DC and AC buggies.

MINE APPLICATIONS

At the Goldie Raye mine, R. F. Willis operates four Murrill 250-v DC buggies, obtaining DC power from the nearby Riverton mine. Each car utilizes 500 ft of 2-conductor No. 10 cable. The cable-attachment nip is positioned at the approximate center of the haul, and each car operates from the mining face to a dump bin just outside of the portal.

Coal is undercut with a shortwall, shot with permissible and hand-loaded

into the shuttle buggies. The mine is a two-shift operation employing 13 men, and production is 12 tons per man working underground. In a mine with excellent natural conditions previously worked with Murrill buggies, R. F. Willis produced as high as 18 tpm. Although many truck mines shoot off the solid, R. F. Willis finds that at Goldie Raye it pays to undercut, thus holding the cost of explosives to approximately 7 to 8c per ton, as compared to something like 50c when shooting off the solid.

Most of the buggies Mr. Murrill has built are working in Kanawha, Nicholas and Greenbrier counties. In Greenbrier County, they are widely used in punch mining of highwalls left by contour stripping. About half of the Greenbrier and Nicholas cars are powered by DC motors and half by AC.

Mr. Murrill reports that one of his low-vein buggies is hauling from a Joy loading machine in one mine in the Pocahontas field. It is also known that a mine in Nicholas County has been trying out a unit consisting of a Joy 12-BU loader and two Murrill buggies, but a disadvantage cited is that under the local conditions the loader can put only 1½ tons in a car.

COALBURGH-KANAWHA CAR

The Coalburgh-Kanawha Mining Co. is producing nearly 500 tpd of premium domestic and steam coal, all hauled with 3-hp DC dropbottom shuttle cars patterned on the general principle of the Murrill buggies. This company's rail and river tipple at Coalburgh, W. Va., is within 100 yd or so of the original river tipple used when the property was opened in 1853. It is one of the two oldest coal operations in West Virginia and one of the four oldest in America (*Coal Age*, March, 1953, p 101).

Five "Coalburgh-Kanawha" buggies are employed in production at this mine, which is in the Cedar Grove seam in 32-in coal. The buggies are hand-loaded and dump to an underground hopper feeding to a Hewitt-Robins 26-in belt conveyor 928 ft long that delivers to a portal bin.

To minimize interference in handling the lumps that result with undercutting, as contrasted with solid shooting, the welded body of the car was redesigned to provide sufficient inherent strength so that the cross pipes at the top are not needed. The car has the typical windlass pipe along the top center for door control and another pipe at one side to shield the steering column. The discharge opening is 4x7 ft with doors dropped. A ratchet wrench is used to turn the pipe windlass to close the doors since there is not enough headroom in the mine to use a crank.

The Coalburgh-Kanawha car is 17½ ft long, 6 ft 6½ in wide and 23.4 in high. The height is the rated diameter of the tires, which are 6.50x 10 10-ply industrial type. The car weighs 2,600 lb without the motor and approximately 2,800 lb with a 3-hp DC motor. No springs are used and three-point suspension is provided by a pivot above the center of the front axle as in the Murrill car. The cars are built with front and rear axles from Plymouth or Dodge cars and with a Chevrolet transmission as a speed reducer between the V-belt and drive shaft. Two of the revised-design cars making up the mine equipment were built under contract with Bob's Welding Service and four were built by the coal company in its mine shop.

Trailing cable consists of a 500-ft length of 2-conductor No. 6 with ground. The cars were first started out in the mine on No. 10 cable, but later the specification was changed to No. 8 and, finally, to No. 6. Mechanical strength, rather than conductivity, is the ruling factor that made the larger cable advisable.

INVERTED TROLLEY SUBSTITUTED FOR SUPPLY HANDLING

For carrying materials and supplies, the Coalburgh-Kanawha cars are powered in and out of the mine by substituting for the dragging cable a 25-ft cable and a double-shoe glider operating on a pair of inverted trolley wires supplying the 250 v DC. The glider, locally termed a "slook," and the inverted hangers were furnished by the Elreco Corp., Cincinnati. Use of an inverted single trolley wire for locomotive operation in another Kanawha-field mine was described in *Coal Age*, October, 1952, p 86.

In addition to the six buggies or shuttle cars and the mainline conveyor, underground equipment at the Coalburgh-Kanawha mine includes five Jeffrey 35B and one Goodman 212 shortwall undercutters (five in use); six Chicago-Pneumatic coal drills (five in use); two Jeffrey 61-HG chain conveyors 25 ft long serving as feeders from two dump pits; and two Long Super Mine Car chain conveyors, 300 and 400 ft long, for haulage from the dump pits to the belt.

The seam has no partings and the strong slate top is free of drawslate. Roadways are 10 ft wide between posts and crossbars are seldom used. Crossbars are avoided on shuttle-car haulways as much as possible because they limit car capacity. The bottom is fairly hard and does not rut. Rooms are driven 25 to 40 ft wide on 55-ft centers, with headings and rooms turned 60 deg. Some 12 to 18 in of top is shot down on the belt heading to provide necessary clearance over the belt. Room headings are driven the same width as the rooms, and room work and heading work are thus practically the same.

A shortwall machine stays in each working place. To reduce the percentage of fines, Airdox shooting was installed 3 mo ago, but its effect on tons per man, if any, has not been determined as yet.

SMALL CREWS CUT SUPERVISION

Three men per face handle the cutting, drilling, shooting, hand-loading and shuttle-car driving, with one shuttle car serving each face. This system of small crews requires little supervision, and crew efficiency is gaged by the number of shuttle cars dumped per shift. As calculated from mine production, shuttle-car loads averaged 1.46 tons in December and 1.39 tons in March. An average of 1½ tons is the goal.

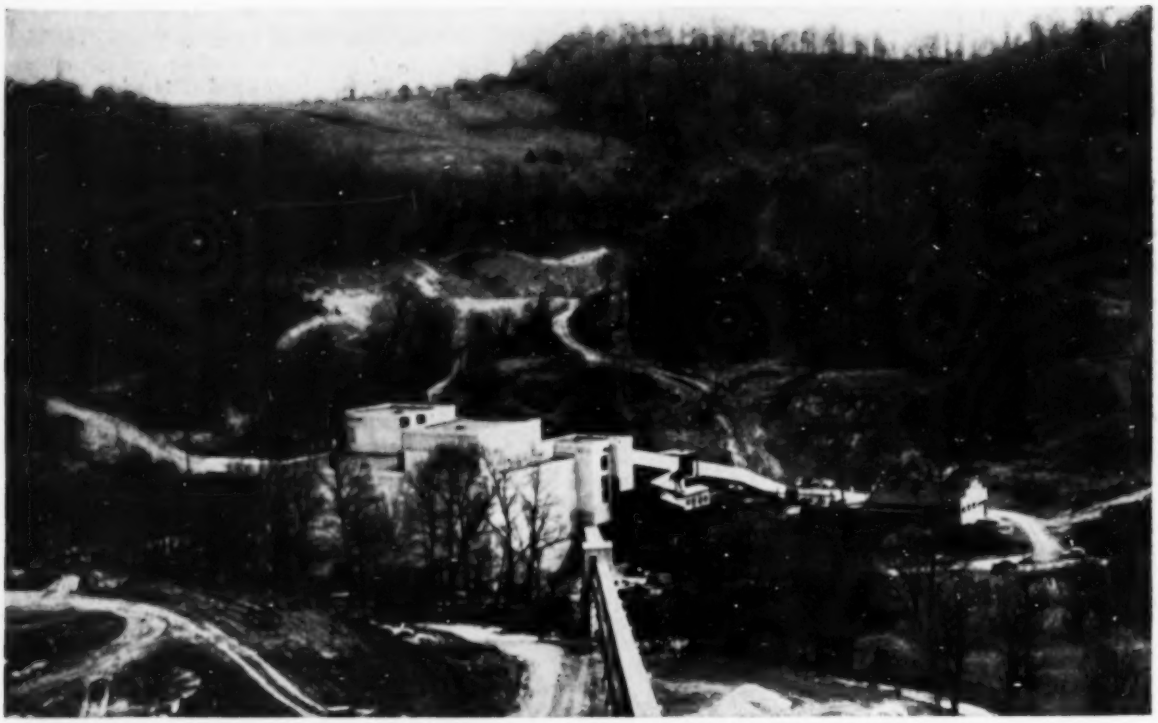
For car dumping, a pit 15 ft long is excavated with a bottom sloping to 5 ft at the deep end. The 25-ft chain conveyor extending on a slope from the deep end serves as the feeder and the coal forms its own hopper. After a driver positions his car astraddle the hopper and trips the doors, he starts the feeder. He then waits until enough coal has moved out so that he can close the car doors, stops the feeder and departs.

MINING PLAN REDUCES COST

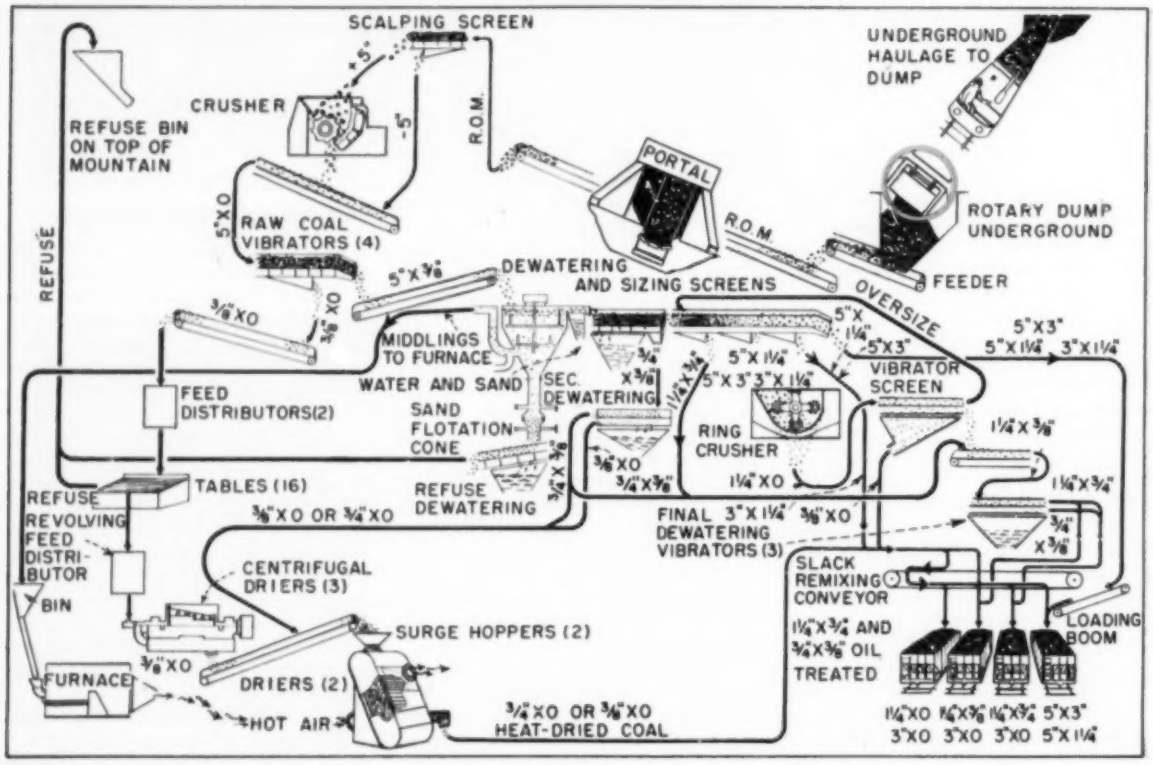
The accompanying center-line drawing indicates the hexagonal area of 800-ft "radius" mined from one loading point. Since this area produces up to 80,000 tons, pit cost is a very small factor per ton. Rooms are driven either from the straight headings or the 60-deg headings, as convenient.

The mine is operating two loading points, with three buggies delivering to one and two to the other. Operating three shifts with a total of 45 facemen, typical production for a day is 470 tons. Other inside labor, including men shooting and handling top material on the main belt entry, adds up to 15 to 20c per ton. The only picking done on the tipple is occasional, to check whether the coal is coming out of the mine clean.

J. A. Willis Sr. is president and general manager of the company, and J. A. Willis Jr. is vice president, mining engineer and general superintendent. John E. Moore is mine superintendent. The Willis family owns the mine.



500 BTU BETTER **NEW WILLIAMS PLANT,** with refuse conveyor in foreground and slope conveyor at rear, upgrades product an average of 500 Btu and employs dual cleaning circuits and centrifugal and thermal driers to produce uniform high-quality fuel.



WILLIAMS COAL FLOW **AFTER MINE-RUN** is crushed to 5 in. the 5x3/8 is cleaned in the cone circuit and the 3/8x0 in the table circuit. Table coal passes to centrifugal and heat driers. The 3/4x3/8 from the coarse-coal circuit may also be heat-dried.

INCOMING OUTGOING **RAW PITTSBURGH-SEAM COAL** is delivered to the Williams plant at a rate of 450 tph by a 42-in slope belt (left). Cleaned and dried coal is loaded on four tracks, right photo, which shows cars leaving the loading bay, served by two railroads.

Uniform High-Btu Industrial Fuel the Goal in . . .

Williams Preparation

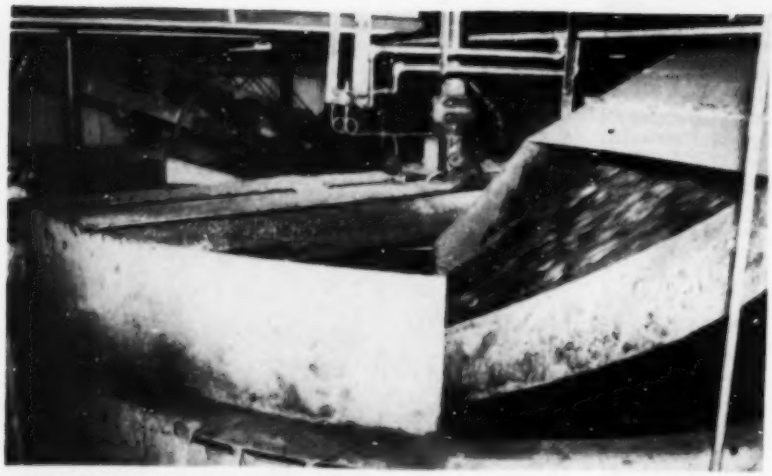
Maximum fuel values provided by wet washing of all sizes, after crushing to 5 in, in dual cleaning circuits, and by centrifugal and thermal drying. Daily capacity of 8,500 tons can be expanded to 15,000 when needed.

"In these days of high freight rates and expensive handling many industrial coal consumers are successfully meeting the challenge of fuel costs through the savings and increased efficiency that come from well-prepared high-Btu bituminous coal. To increase our ability to meet this need, we have built the most modern coal-mining and preparation facility in the Fairmont region. Williams mine has the largest production potential and the longest life expectancy of any Pittsburgh-seam operation in northern West Virginia."— ***George R. Higinbotham, president, Consolidation Coal Co. (W. Va.), Fairmont, W. Va.***

DEVELOPED from a property which produced but 400 tons of raw coal per day when it was acquired by Consol of W. Va., Williams mine, with its new preparation plant now in operation, now has an immediate daily capacity of 8,500 tons of washed coal, and can be expanded to 15,000 tons per day when required.

Ground was broken for the plant on July 19, 1951, and it was turned over for the first time March 31, 1953. It is located in Harrison County, West Virginia, near Shinnston and not far from Fairmont, with access to two railroads. The actual location is on the Bingamon Creek branch of the Western Maryland Ry., and the plant also is served by the Baltimore & Ohio.

The goal in the Williams mine and preparation project, states Mr. Higinbotham, has been to develop an unmatched regional source of uniform high-quality industrial and stoker coals. The preparation plant is the latest in a series of improvements and new developments initiated immediately after its formation by the Pittsburgh Consolidation Coal Co. Its completion represents the $91 million point in Pittsburgh Consol capital expenditures since 1946. The company, throughout its five divisions, now has 17 new or improved preparation plants. These serve 25 modernized mining operations, or all the



CONE CLEANING AFTER REDUCTION to 5 in, the 5x⅜ fraction is cleaned in this sand-flotation cone at Williams mine.

TABLE CLEANING CLEANING in the fine-coal circuit at Williams mine is done on 16 coal-washing tables handling ⅜x0.

CLASSIFYING SHAKERS AND SPRAYS desand, dewater and classify washed coal from the sand-flotation cone.

Williams Highlights

First Pittsburgh-seam operation in northern West Virginia to wet-wash all sizes and thermal-dry fines.

Longest life expectancy and largest production potential of any underground bituminous operation in northern West Virginia.

Modern design—windowless architecture, vacuum dust collection and ventilation, fluorescent lighting, centralized controls, elevator access to all major operating levels.

Thermal drying of all minus ⅜ coal; also ¾x0 slack.

Special facilities for producing stoker coal, including oil-treating.

Mixing conveyor serving all loading tracks and producing any combination of sizes.

Four loading tracks and service by two railroads.

Present daily capacity, 8,500 tons; potential, 15,000 tons; design provides for additional tables for ¾x0, second cone for 5x⅜, and additional centrifugal and thermal driers.

Raw-coal conveyor, 558 ft long; refuse conveyor, 1,400 ft long.

Track storage, 100 empty cars; 80 loaded cars.

Materials used—2,372 yd of concrete in foundations; 1,154 yd in floors; 2,187 tons of steel; 7,205 lin ft of conveyor belting; 201 motors totalling 2,840 hp; 46 tons conduit; 54 mi wiring; 940 lighting fixtures; 41 cases light bulbs; 4,000 ft fluorescent lamps.

Contractor, Fairmont Machinery Co.; electrical work, West Virginia Electric Co., Fairmont, W. Va.; design by Fairmont Machinery in collaboration with engineers of Consolidation Coal Co. (W. Va.) and Pittsburgh Consolidation Coal Co.

long-life properties producing coal for commercial markets.

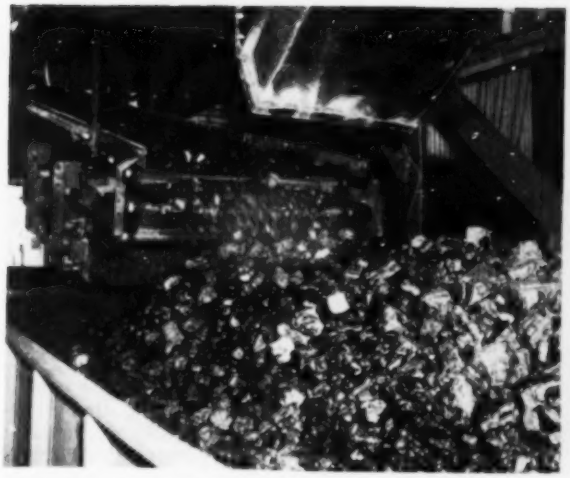
WILLIAMS "FIRSTS"

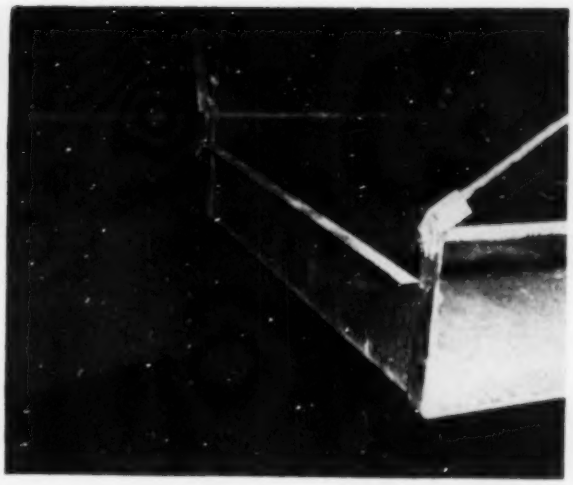
Formal dedication of the Williams plant is expected in September of this year. It was designed and built by the Fairmont Machinery Co. "Firsts" and unusual features include the following:

1. Unlike any other Pittsburgh-seam operation in the Fairmont region, two distinct types of wet-washing equipment are employed.

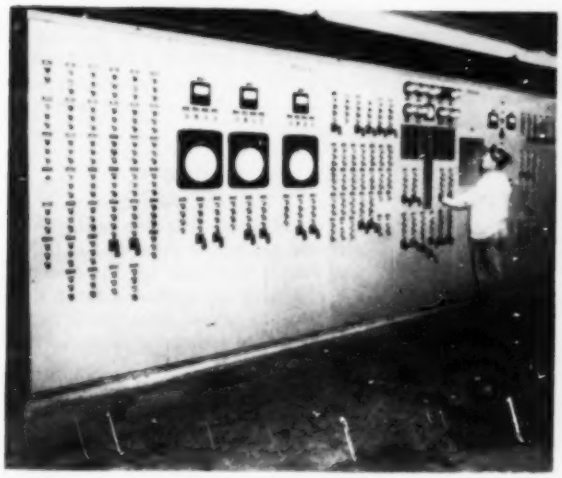
2. Thermal drying is used for the fine sizes, in addition to centrifugal drying and normal dewatering screens.

3. Liberal extra space has been provided and the design tailored to permit rapid expansion of preparation capacity by the addition of another

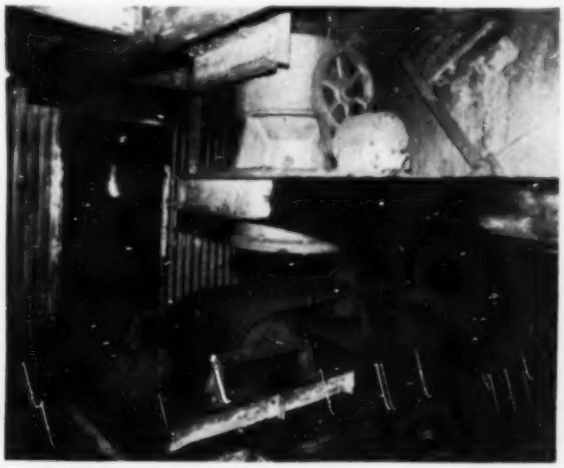




LOADING **FOUR TRACKS** receive cleaned and dried coal at Williams preparation plant. One is provided with a boom, the other three with chutes. All are equipped with air-operated diversion gates.



CONTROL **ALL PLANT OPERATIONS** are controlled by one man from this master panel.



SAMPLING **AUTOMATIC SAMPLERS** at strategic spots in the plant facilitate quality control.

Chance cone, additional Deister SuperDuty Diagonal-Deck tables, and additional centrifuges and thermal-drying equipment.

4. Enclosed modern design has resulted in employees christening the plant the "Williams Windowless Wonder." Construction is steel and concrete, and the plant occupies slightly over an acre, with the equivalent of 3 acres in its eight operating levels extending up to 100 ft above ground level.

5. Special features include a vacuum dust-collection and ventilating system, fluorescent lighting, elevator serving all operating levels and a loudspeaker system.

TWO CLEANING CIRCUITS

Coal is brought into the Williams plant from the bottom of the slope serving the mine by a 48-in raw-coal belt. Under the current operating schedule, coal can be fed in at a rate of 450 tph to provide a yield of 412 tph of cleaned prepared coal. From the belt, the coal goes to a scalping screen which separates out the plus 5-in for crushing to minus 5-in. After scalping and crushing, the raw coal is separated into 5x⅜ and ⅜x0 fractions, each fraction going into a separate cleaning circuit.

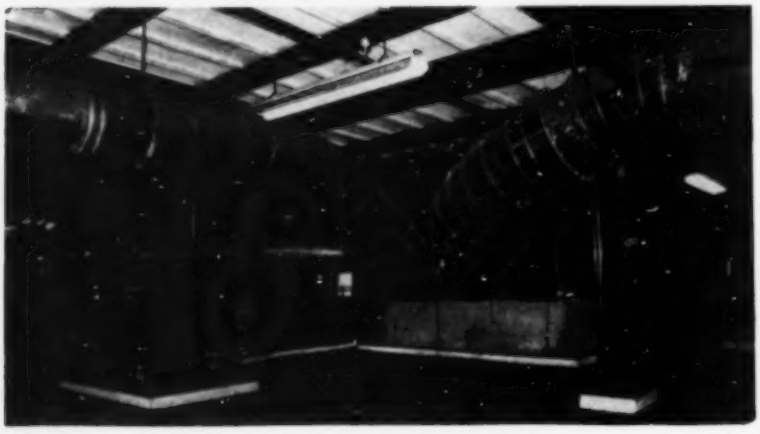
The ⅜x0 is conveyed to 16 SuperDuty Diagonal-Deck tables set in two banks of eight each on two levels. These double banks can be expanded at both ends to permit installation of at least eight more tables. It is expected that the 16 tables now installed can provide a clean product of 134 tph.

Table coal passes to three Bird centrifugal driers which reduce the moisture content to approximately 8%. Two heat driers then reduce the surface moisture of the ⅜x0 to the minimum desired. The cleaned and dried coal then is transferred to a mixing conveyor, from which it can be loaded separately into railroad cars or blended with any of the primary sizes.

The 5x⅜ is fed to a 15-ft specially designed Chance cone providing for the production of a middlings fraction. The banded, or middlings, product is used to fuel the thermal driers. Provision for taking out middlings permits an unusually high efficiency in cleaning the coal, thus assuring consumers high and uniform quality without undue sacrifice of yield.

Expected yield of the cone is 378 tons of cleaned coal per hour. Washed

CRUSHING **PRIMARY CRUSHERS** have a capacity of 100 tph and the secondary crushers, 255 tph.



COMFORT **GOOD WORKING CONDITIONS** are insured by a vacuum dust-collecting system, as well as fluorescent lighting.

coal from the cone goes to classifying and dewatering screens making the following sizes: 5x3 egg, 3x1¼ nut, and 1¼x¾ and ¾x⅜ stoker.

The ¾x⅜ may be loaded as a separate product or blended with the other sizes. It also may be passed through the heat driers where it can be combined with the ⅜x0 for loading as ¾x0 cleaned and thermally dried slack, if desired.

The two cleaning circuits are brought together at the loading station where the mixing conveyor makes possible almost any combination of sizes. The stoker sizes are rescreened before loading and can be oil-treated by a Viking system serving the two stoker conveyors.

Automatic samplers strategically located throughout the plant assure continuous quality control. Except for the loading operation, the entire plant is controlled by one man at a main panel on the third operating level.

LOADING WILLIAMS COAL

Williams plant is designed to load to four tracks, with a combination of electric and manual controls for each. One of the four tracks is equipped with a boom for loading the coarse sizes. Loading on the other three is by means of chutes, and these three tracks are interchangeable as to sizes handled.

The mixing conveyor is provided with electrically operated sliding gates. Air-operated diversion gates permit continuous loading while changing cars. Actual lowering of the chutes or boom is controlled manually to prevent degradation. Normal operation permits loading one car every 7 min. Track facilities accommodate 100 empty and 80 loaded cars.

WILLIAMS SERVICE

The Williams preparation plant operates primarily on city water, although rain water is collected on the roof and creek water is available. The outside storage reservoir has a capacity of 4,000,000 gal, while storage tanks in the plant hold 200,000 gal. The plant has a circulating capacity of 15,000 gpm, and water loss is estimated at 100 gpm.

The primary crushers have a capacity of 100 tph and the secondary crushers, 255 tph.

The lighting system provides 15 cp of illumination at eye level in all general areas and 30 cp at the control panel and in other vital areas. Communication is assured by a telephonic system with nine stations, with transmitters and receivers in noiseproof booths at strategic locations throughout the plant.

A total of 201 motors, aggregating 2,840 hp, operate the plant. The vacuum dust-collecting system requires 75 hp. A total of 7,205 ft of belting moves the coal through the preparation process, and 54 mi of electric wiring is installed.

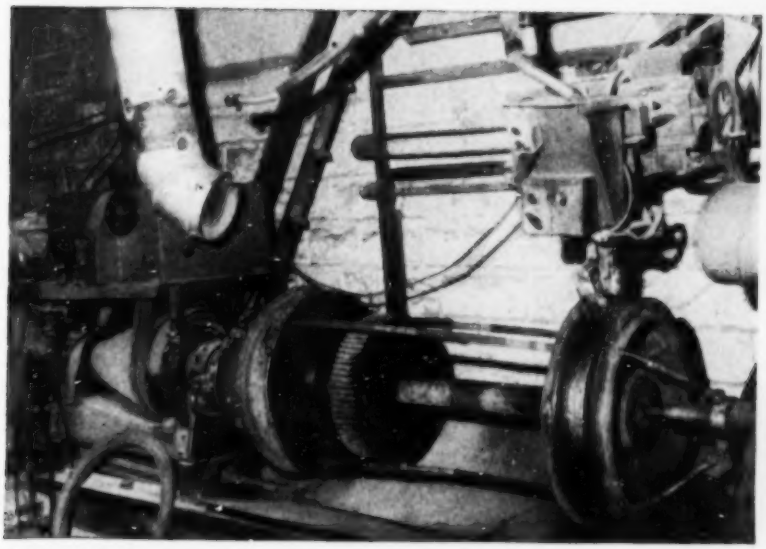
WILLIAMS MINING

The Williams preparation plant, it is pointed out, adds much to the value and nothing to the price of the industrial coal it produces. On the average, the coal will be upgraded more than 500 Btu per pound, in addition to the advantages of job-engineered fuel and uniform quality.

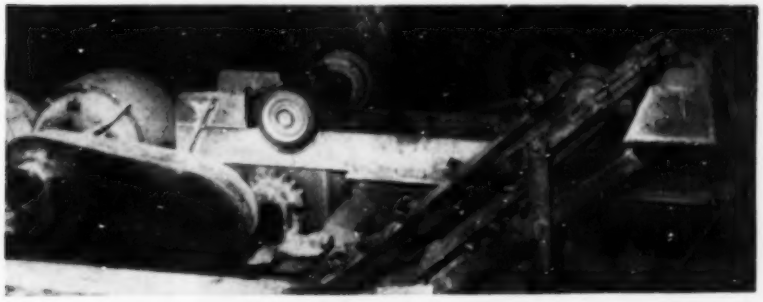
Such upgrading in quality, with its attendant loss of yield and cost of preparation, is possible only because the plant is backed up, in Mr. Higinbotham's words, "by the best-equipped underground operation in the area." The aim is to generate long-term acceptance and stable demand, so that the large reserves can be developed and mined with continuity and efficiency.

Haulage is based on 42-in gage track, 85-lb rail, Goodman Model 81 tandem locomotives, and 10-ton steel cars. Face equipment includes Joy 10-RU cutters, 11-BU loading machines and 10-SC shuttle cars, with special roof-bolting equipment. The coal is 68 ft below the surface at the site of the preparation plant, with the hills rising to 500 ft above the coal at other points. The men enter the mine at a slope near the preparation plant. Underground facilities include a tunnel under Bingamon Creek to prevent water seepage.

A portion of the reserves is of metallurgical quality which, when ready for development, will widen the market opportunity for the operation.



MINE-BUILT WELDING UNIT automatically builds up locomotive wheels, producing a better job with appreciable savings in labor and materials.



FLUX RECOVERY is improved with this equipment which screens and crushes excess flux and returns it to welder's flux hopper.

Automatic Wheel Welder Saves Labor and Material

SAVINGS IN LABOR AND MATERIAL are achieved with an automatic electric-arc welding unit designed and built by James Bowyer, shop foreman, and Jesse Evans, shop mechanic, at the Minden (W. Va.) mine of the New River & Pocahontas Consolidated Coal Co.

Formerly, worn locomotive wheels were built up by hand-welding methods. The job was hard on the welder, the weld was not smooth and a great deal of time was required for each wheel buildup. It also was a difficult job to build wheels up to size and wheels wore down quickly. Since the new machine has been in operation, purchases of replacement wheels have been eliminated, the built-up area is such more uniform and the wheels remain in service much longer than when rebuilt by hand.

Another important feature of the machine has been a reduction in shavings of up to 90%. When the wheels were built up by hand, 50 to 65 lb of shavings was made in turning down a wheel to the proper diameter. Now, there is only 5 to 8 lb of shavings per wheel.

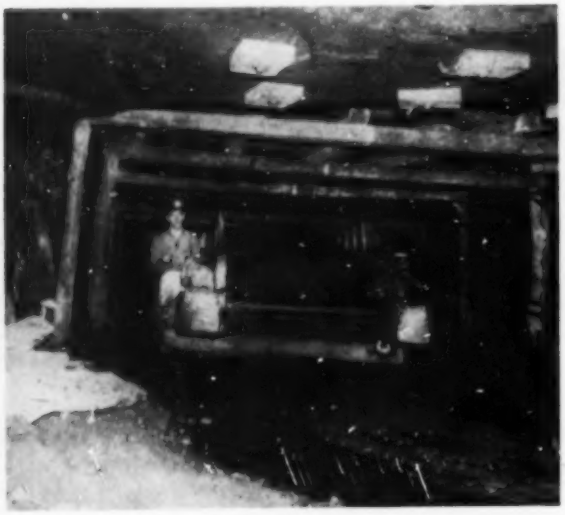
The machine automatically welds a strip about ¾ in wide and ⅛ in thick around the circumference of the 33-in locomotive wheels. Then the machine operator turns a small wheel that moves the welder feed to a new starting point next to the completed band. This cycle is repeated until the wheel is built up to normal diameter. The machine can weld about 30 in per minute on a 33-in wheel and 20 in per minute on an 18-in wheel.

Welding flux is gravity-fed from a small hopper to the point of weld. As excess flux falls off in the welding process, it is picked up by a 6-in belt conveyor that delivers it to another room. There a screen separates it into plus and minus ⅛-in sizes. The larger material passes to a small roll crusher where it is reduced to minus ⅛ in and passed to the other small-size flux. A small bucket elevator recirculates it to the flux hopper on the welder.

Power for the welder is supplied by a 3-hp motor driving a speed reducer. A group of pulleys connected to the motor with V-belts permit speeds from one complete revolution in 5 min to five revolutions per min.

Other company men who assisted in building the machine are: Theron Bowyer, welder; Dave Snell, machinist; and Hubert Hitchcock, machinist.

Continuous miner, in open-end pillar work, loads . . .



New-type shuttle car, chosen for job because of its . . .

Low ground pressure, an advantage in soft, wet bottom.

Pillar-Mining Team:

Continuous Miner and Tracklaying Shuttle Car

Problem:

Recovering Pittsburgh-Seam pillars sandwiched between wet fireclay bottom and drawslate top

Jamison Solution:

Continuous mining, with pickup loading unit and crawler-mounted shuttle car for intermediate haulage

GIVEN THESE CONDITIONS, a wet fireclay bottom, a drawslate roof and a track-and-mine-car haulage system, how would you go about the job of retreating a pillar section in the 96-in Pittsburgh seam?

If you have your track already in place after your development work is done, and if the section is big enough to justify the service labor you'd need to move the track as the section is retreated, the question just about answers itself. You'd probably go along with track-mounted equipment to keep yourself out of the "gooey" bottom.

But that's not the way things stood at Jamison No. 21 mine, Jamison Coal & Coke Co., Hostetter, Pa., a producer of famed Connellsville coking coal. The development work had been done some time before and the track had been removed for use elsewhere. Furthermore, the pillar section is a considerable distance from the other active sections.

Now, from a fresh start what would you do?

Here's what Jamison officials did, and they're satisfied with the results.

It was decided to make an effort to work the pillars with off-track equipment, laying only enough track to bring the mine cars within a reasonable distance for shuttle-car intermediate haulage.

Next order of business is choosing the machines to do the work. After carefully weighing all the factors, Jamison officials settled upon this unusual team: a continuous mining machine, a pickup loading machine and a tracklaying shuttle car. Here's why.

The pillars are taken open-ended by mining successive 12-ft-wide skips straight along the inby ends of all pillars in the section. This is a nice working width for a continuous miner, the men figured, and the big brute could

sit on the centerline of the skip to work at the face with a minimum of maneuvering. By the same token, there would be no parade of single-purpose units in and out of the working places to foul up the bottom.

The conventional loading machine would follow the continuous miner to smooth out production surges, although at the time the mine was visited the pickup loader was ailing. The continuous miner is a Joy 4-JCM and the pickup loader is a Joy 7-BU.

For hauling the coal from the face to the 8-ton steel mine cars, an 8-ton (with sideboards) General Electric Type TLE-6B2 tracklaying shuttle car was selected because it was felt the low ground pressure of the unit would preserve the roadway and eliminate a possible need for corduroying. The matched capacities of the shuttle car and the mine cars, along with the wide conveyor in the shuttle car, contribute to faster discharging. One buggy load makes one car load, and the mine car need be pulled ahead only a half car-length while the shuttle car discharges.

The pillar-mining crew includes five men, as follows: A continuous-miner operator, a loading-machine operator, a shuttle-car operator and two timbermen. The operation is on a two-shift basis.

With regard to production, George M. Cicero, mine superintendent, says, "We have made as many as 40 cars per shift, but our average is somewhat lower because we have to clean up fallen slate in almost every entry we cross. On the other hand, that deadwork permits us to run this job with one shuttle car because the pickup loader and shuttle car can continue to work on coal, if necessary, while the slate is being cleaned."

Roof-support work, timbering and bolting, is done according to strict standards which have been tested and adopted by the company and approved by the Pennsylvania Department of Mines.

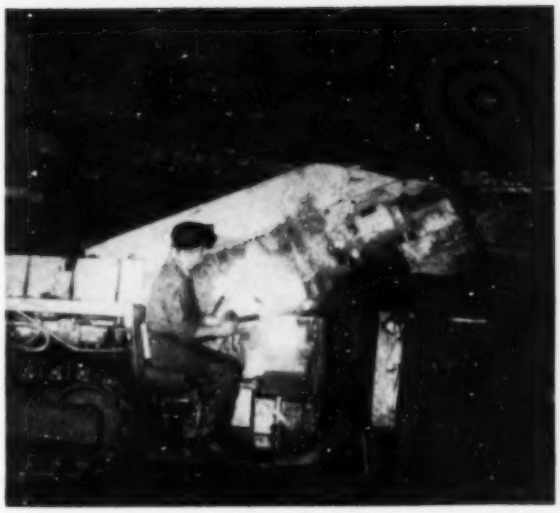
The immediate roof consists of from 18 to 24 in of drawslate under the main roof. About 12 in of top coal is left in place to seal off this drawslate. Crossbars, 5x6 in by 12 ft, are installed on 5-ft centers in the 12-ft-wide places. However, 15-ft crossbars are used at intersections, all of which are turned at 60 deg.

The approved bolting plan for holding the 12 in of roof coal and the drawslate in place stipulates the use of 6-ftx¾-in bolts with expansion-shell anchorage in the main roof. Roof plates are 3x10x18-in planks and 3½x3⅜-in steel washers. The holes are drilled by an Ingersoll-Rand Model 48 stoper, bolts are tightened with an IR Model 534 impact wrench and compressed air is supplied at 110 cfm and 100 psi from an IR Model 25B compressor mounted on a mine car.

The bolts are used in the haulage entries in rows midway between adjacent timber sets, with bolts in each row spaced 3 ft apart. At intersections used as loading points, the spacing is closed up and bolts are used exclusively.

In other sections of the mine, pillar recovery still is a job for crews using track-mounted loading machines and cutting machines and hand-held electric drills. In these places, the work is done on a modified open-end system since 5x6-ft stumps are left along the gob line to insure adequate support.

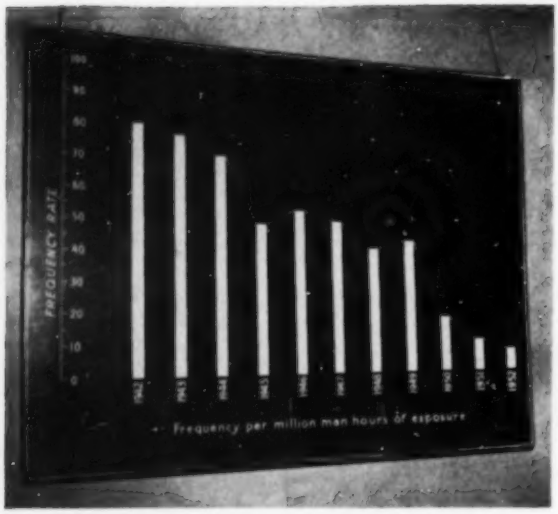
Top officials who sparked the development of the off-track pillar-recovery method are: R. E. Jamison, president; W. B. Jamison, vice president—operations; and George McCaa, general manager. In charge at the mine are Mr. Cicero and Vincent Miller, mine foreman.

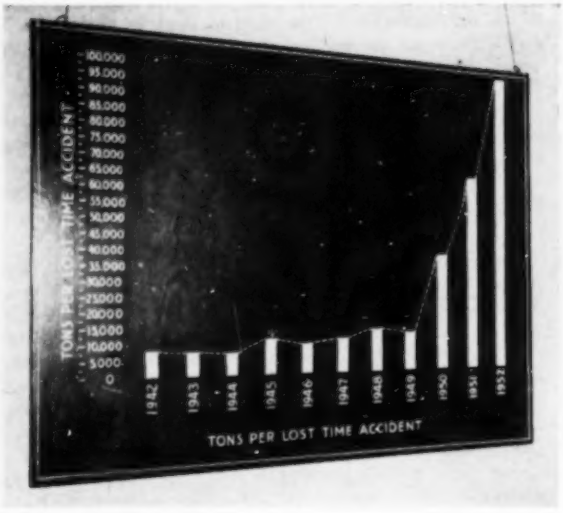


THE 8-TON LOAD is discharged over the car's own elevator to an 8-ton steel mine car in a minimum of time.

OPERATOR steers car by depowering or braking individually controlled tracks through 'dozer-like control levers.

G. M. CICERO (right), superintendent, and Vince Miller, mine foreman, supervise pillar-recovery operations.





10 YEARS OF SAFETY PROGRESS:

FREQUENCY RATE down 90% . . . TONS MINED per accident up 13 times.

Tops in Mine Safety —*How Did They Do It?*

"Consolidation Coal Co. (Ky.) Division attained the outstanding record of 7.9 lost-time accidents per million man-hours on a total production of 2,391,000 tons."—*1952 Annual Report, Pittsburgh Consolidation Coal Co.*

Behind this outstanding achievement combining fatality-free operation and a low frequency rate—and putting the company at the top in coal-mine safety in the Nation—is a story of consistent effort and progress. In the past decade, the company has reduced its frequency rate from 82.6 to the 1952 figure of 7.9. In one year, 1950, a reduction of 60% was marked up over the previous year, a drop from 45.8 to 19.0. Nor is the end in sight, as a rate of 5.6 for the first 4 mo of 1953 indicates.

How was all this done? What furnished the inspiration to officials and employees of Consolidation Coal Co. (Ky.)? This article, prepared by a *Coal Age* editor following a trip to the properties, centering at Jenkins, Ky., is an attempt at the answer.

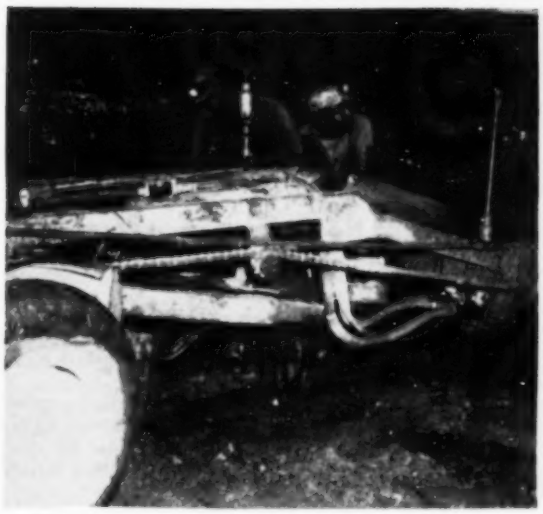
By J. H. EDWARDS
Associate Editor, Coal Age

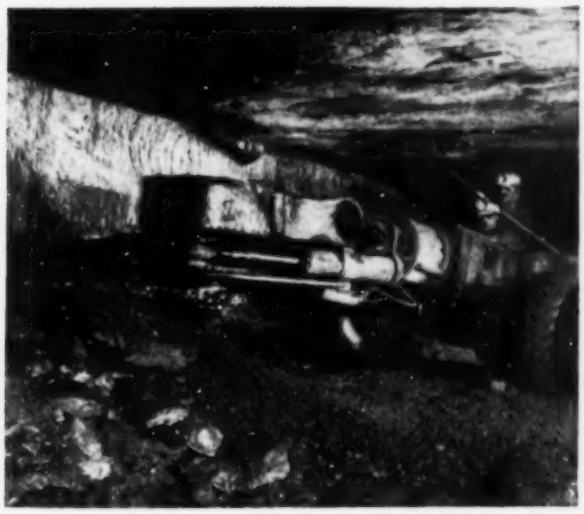
OVER THE YEARS, beginning about 1928, the Consolidation Coal Co. spent large amounts on safety and compiled elaborate safety rules covering mining installations and working methods, but for some reason it failed to achieve a good safety record in any year. In 1946, Consolidation Coal Co. (Ky.) took over the Clover Splint mining property at Closplint, Harlan County Ky., and it was this move that indirectly put officials of the company on the right track to real accomplishment in safety.

At Clover Splint, the new owners inherited a very bad situation as far as the physical condition of the mine and a very high accident rate were concerned. Clover Splint's frequency rate was running about three times that of other mines of Consolidation (Ky.). During the years 1946-7-8-9 an intensive program of mine betterment was carried out but only a moderate decrease in the accident rate was obtained. The frequency dropped from 147.2 in 1947 to 101.1 in 1948, and to 98.5 in 1949. While better, this still was alarmingly high. It also had been discovered that the mine employees, including supervisors, had no conception of what real safety was and, with few exceptions, had never had first-aid or accident-prevention training of any sort.

TRAINING MADE DIFFERENCE

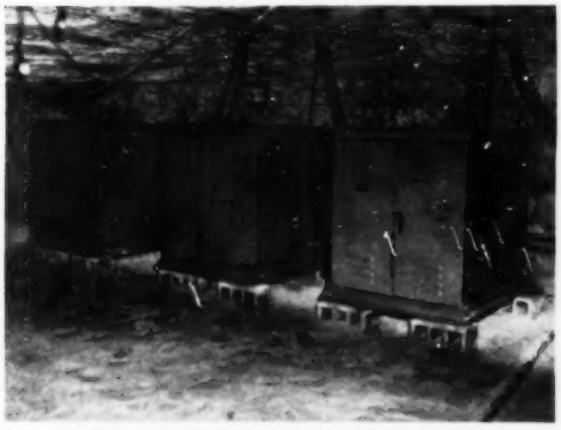
As a result of these facts, and perhaps somewhat in desperation, a series of training programs was begun. During 1948 the mine achieved 100% first-aid training of employees, including the girls in the office and many young sons of employees. Supervisors also took the 40-hr accident-prevention course of the USBM. The real pay-off, however, came after the accident-prevention training was given to





TYPICAL OF PROPER WORKING CONDITIONS stressed by the company, roof-bolting is done with a special machine using water to allay drilling dust. Driller and bolter work under roof protected by the last row of bolts and two steel-jack safety posts. Cutting-machine operators (right) work under bolted roof, with water spray on cutterbar allaying dust.

Good Working Conditions Set Safety Stage



AUTOMATIC RECLOSING BREAKERS on all branch circuits isolate electrical difficulties and practically eliminate chance of fires from grounds or shorts. Entire safety department (right) consists of: L. H. Davis (left), inspector; M. E. Prunty, safety director; and C. D. Halbert, inspector.

all employees in the latter part of 1949. This resulted in a drop in frequency rate from 98.5 in 1949 to 11.0 in 1950, and Clover Splint did even better in 1951 and 1952.

While all employees and their instructors deserve full credit for the tremendous improvement, it was really sparked by the enthusiastic determination of H. Carl Mercer, Clover Splint superintendent, and the full backing given him by Taylor Maddox, then the safety director of District 19, UMWA.

SUCCESS POINTS WAY

The rapid progress at Clover Splint through education and a demonstration of sincerity served as a signpost for the company's safety department. S. M. Cassidy, president, and G. O. Tarleton, vice president-operations, concurred in the conclusions indicated and gave M. E. Prunty, safety director, a green light to go all out in promoting safety education to teach the men to want safety, to work safely and to convince them that the company really felt that safety and efficient production were one and the same.

A complete new start was made—with all the old standards thrown out! Mr. Prunty, who had had many years experience as a mine superintendent for the company, set out to correct the

Table I—10 Yr of Progress

Year	Tons Mined, Clean Coal	Tons per Lost-Time Accident	Frequency
1942	2,934,275	7,409	82.6
1943	2,863,344	7,456	80.9
1944	3,150,662	7,293	76.7
1945	2,598,198	10,736	54.0
1946	2,593,533	9,787	57.1
1947	2,758,713	10,991	52.1
1948	2,189,751	12,957	44.2
1949	1,170,560	12,068	45.8
1950	1,659,189	38,586	19.0
1951	2,199,780	68,743	11.2
1952	2,126,180	106,309	7.9
1953 (4 mo.)		157,153	5.6

shortcomings he had observed as an operating man. In this respect, he says, "One dishonest deed can ruin a whole safety program."

Mr. Prunty has only two assistants, L. H. Davis and C. D. Halbert, both of whom are classed as mine inspectors. Mr. Halbert also teaches ABC or refresher courses which deal with company standards, the mining code and state laws, and instructs first-aid and mine-rescue teams. All three men spend practically all their time in the mines or with classes.

Consolidation Coal Co. (Ky.) now operates three large mines, following sale of its Clover Splint mine on March 1 of this year to the newly organized Closplint Coal Co. The extent of its operations is indicated by Table I for the past 10 yr. This table again proves the point learned at Clover Splint: that good physical conditions in the mines, laws, codes and strict safety rules will only achieve a moderate improvement in safety—that real improvement comes only with training and instilling in each man a belief in safety.

OBJECTIVES SET YEARLY

Definite objectives in education, training and safety records are set up each year. They are constantly kept before the supervisory group and carried right to the men at the face. An objective is never given up! Failure to accomplish an objective in a specified time automatically gives its first priority in the next period. A listing of the education and training objectives appears in the 1953 portion of Table II. They are, of course, closely tied in with the accomplishments shown for the first 4 yr. This tabulation also reveals how the program has been stepped up in the last few years.

Consolidation Coal Co. (Ky.) officials realized from the beginning that success of the safety program required the cooperation of the United Mine Workers, and they report that that cooperation has been provided 100%. Also, company officials have been gratified by the way officials of the various agencies have given unstintingly of their time. Real help came from the Kentucky Department of Mines and Minerals under A. D. Sisk; from the U. S. Bureau of Mines, Norton Branch, formerly under W. H. Tomlinson and now under J. B. Benson; from J. H. Mosgrove, safety director, Big Sandy-Elkhorn Mining Institute; and Ed Starling, safety director, Harlan Mining Institute. It has been a case of everybody pulling together.

WORKINGS IN GOOD SHAPE

Good, safe working conditions and good housekeeping, both inside and outside of all mines and plants, is an operating policy constantly kept in mind. Achievement of this is reflected in the reports of state and federal mine inspectors. In over 3 yr, there has been only one recommendation made that was not carried out before the inspector left the mine and so noted on his report. This one case involved a practice that had been approved a number of times before but, without warning, was suddenly disapproved and could not be changed before the inspector left. There have been a number of in-

Table II—Consol's Safety Program 1949-1952 Accomplishments 1953 Objectives

1949—Safety Record Showed No Improvement Over 1948

CLOVER SPLINT MINE

Training:
100% trained in USBM 20-hr Accident Prevention Course—the first mine in Harlan County, first in Kentucky and third in U. S. to complete this course 100%.

Team Competition:
Mine Rescue—1st place, Harlan Dist.
White First Aid—1st place in Harlan District.
Colored First Aid—2nd place in Harlan District.

MINE 204

Team Competition:
Mine Rescue—1st place, Big Sandy-Elkhorn District.
White First Aid—2nd place, Big Sandy-Elkhorn District.
Colored First Aid—2nd place, Big Sandy-Elkhorn District.

MINE 214

Team Competition:
White First Aid—1st place, Big Sandy-Elkhorn District.

HENDRIX MINE

No Program in 1949.

1950—Safety Record Improved 60% Over 1949

CLOVER SPLINT MINE

Team Competition:
White First Aid—Kentucky Champions.
White First Aid—1st place, Harlan Dist.
Colored First Aid—1st place, Harlan District.

MINE 204

Training:
100% trained in first aid.

Team Competition:
White First Aid—National Champions.
White First Aid—2nd place, Big Sandy-Elkhorn District.
Mine Rescue—2nd place, Big Sandy-Elkhorn District.

MINE 214

Training:
100% trained in first aid.

Team Competition:
White First Aid—2nd place, National Contest.
White First Aid—1st place, Big Sandy-Elkhorn District.

HENDRIX MINE

Training:
100% trained in first aid.

CENTRAL SHOPS AND BEEFHIDE OPERATION

Training:
100% trained in first aid.

JENKINS PREPARATION PLANT

Training:
65% trained in first aid.

1951—Safety Record Improved 40% Over 1950

CLOVER SPLINT MINE

Training:
100% trained in first aid.
Foremen trained 100% in USBM 40-hr Accident-Prevention Course.

Team Competition:
Mine Rescue—Kentucky Champions.
Mine Rescue—3rd place, National Contest.
White First Aid—1st place, Harlan District.
Colored First Aid—1st place, Harlan District.

MINE 204

Team Competition:
Competed but won no honors in District or National Contests.

MINE 214

Team Competition:
White First Aid—Kentucky Champions.
White First Aid—3rd in National Meet.

HENDRIX MINE

Team Competition:
White First Aid—Tied for 1st place, Big Sandy-Elkhorn District.

1952—Safety Record Improved 30% Over 1951

CLOVER SPLINT MINE

Training:

All foremen trained 100% in advanced mine rescue (60 hr).

All foremen trained 100% in ABC course.

Team Competition:

White First Aid—1st place, Harlan District.

Colored First Aid—1st place, Harlan District.

Colored First Aid—Kentucky Champions.

MINE 204

Training:

100% trained in USBM Accident-Prevention Course.

All foremen trained 100% in mine rescue (20 hr).

All foremen trained 100% in ABC course.

All underground employees required to use flame safety lamp trained and certified by the state.

Team Competition:

Mine Rescue—Kentucky Champions.

Mine Rescue—District Champions.

Colored First Aid—District Champions.

MINE 214

Training:

All foremen trained 100% in advanced mine rescue (60 hr).

All foremen trained 100% in USBM 40-hr Accident-Prevention Course.

All foremen trained 100% in ABC course.

All underground employees trained in the use of safety lamp and certified by state.

Team Competition:

New teams competed, but won no honors.

HENDRIX MINE

Training:

All foremen trained 100% in mine rescue (20-hr) and 95% trained in advanced mine rescue.

100% trained in USBM Accident-Prevention Course.

All foremen 100% trained in USBM 40-hr Accident-Prevention Course.

All underground employees trained in use of flame safety lamp and certified.

All foremen trained 100% in ABC course.

Team Competition:

Competed, but won no honors.

1953—Education and Training Objectives

MINE 204

Training:

Review of important points of ABC course (4 to 6 hr).

Advanced mine-rescue training for all foremen (completed the first 20 hr at date of this report).

100% first-aid training.

Review of accident-prevention course, probably six classes during the year.

Classes for all employees who want to be certified foremen, to be taught by J. H. Mosgrove, safety director, Big Sandy-Elkhorn Mining Institute, 60 hr.

Teams:

Combination first-aid and mine-rescue team.

Colored first-aid team.

MINE 214

Training:

Review of important points of ABC course.

100% accident-prevention training (USBM).

100% first-aid training.

Review of advanced mine-rescue course, including organizing of younger foremen into teams that will practice together eight to ten times during the year.

Classes for all employees who want to be certified foremen, to be taught by J. H. Mosgrove.

Review of accident-prevention course, probably six classes during the year.

Teams:

One white first-aid team.

One colored first-aid team.

One mine-rescue team.

HENDRIX MINE

Training:

Review of the important points of ABC course (4 to 6 hr).

100% first aid training.

Review of the accident-prevention course, probably six courses during the year.

Review of the advanced mine rescue course, including organizing of younger foremen into teams that will practice together eight to ten times during the year.

Classes for all employees who want to become certified foremen, to be taught by J. H. Mosgrove.

JENKINS PREPARATION PLANT, CENTRAL SHOPS AND BEEFHIDE OPERATION

Training:

100% first aid.

100% USBM Accident-Prevention Course, 20 hr completed at this report.

ABC course for all outside foremen.

spections made without a single recommendation. Company officials feel that proper working conditions are necessary to prove sincerity in safety work.

Winning both first and second places in the National First Aid Contest at Pittsburgh in 1950 gave safety a big boost at the company's mines. Although team members and officials had felt that they had achieved the tops in training, the Pittsburgh contest proved it. Here is the way Mr. Prunty put it: "That awoke everyone to the possibilities we had here and proved a spur to achieve a safety record of the same caliber."

Two major goals were set: (1) Best safety record of any division of the Pittsburgh Consolidation Coal Co. (reached); and (2) best safety record of any coal company in the country (reached, or at least very nearly so).

EMPLOYEE INCENTIVES OFFERED

Providing effective incentives for attendance at meetings and for practicing everyday safety has played a large part in bringing the frequency rate of the Consolidation Coal Co. (Ky.) to its present low, which is only 13½% of the coal industry's 1952 rate. Safety-wise, the company ranks with "Wholesale," the 15th safest industry in the country (National Safety Council, 1951 data).

By working safely and seeing that his fellows do the same, every workman is given a chance to win a ham for Christmas. Under this award program last year (running from Dec. 1, 1951, through Nov. 30, 1952), the company presented workmen with 1,300 hams. To win, a miner or other workman must belong to a group which as a whole first achieves a safety goal, and he then must qualify, individually, as outlined in the following rules for the current year:

GROUP REGULATIONS

AT DEEP MINES: The individual mine must attain an average of 50,000 tons of shipped coal production, or better, for each lost-time accident for the 12-mo period ending Nov. 30, 1953, to make its employees eligible. A penalty of 48,000 tons will be made against the year's tonnage for a fatality.

AT JENKINS PREPARATION PLANT: The Jenkins preparation plant must not have more than two lost-time accidents for the 12-mo period ending Nov. 30, 1953, to make its employees eligible. A fatality shall automatically disqualify this group.

AT BEEFHIDE OPERATION: The Beefhide operation must not have more than one lost-time accident for the 12-mo period ending Nov. 30, 1953, to make its employees eligible. A fatality shall automatically disqualify this group.

GENERAL MINE CREWS (204-214-Beefhide): This group must not have more than two lost-time accidents for the 12-mo period ending Nov. 30, 1953, to make its employees eligible. A fatality shall automatically disqualify this group.

GENERAL OUTSIDE GROUP: The general outside group must not have more than two lost-time acci-

CONSOL'S HONOR ROLL

Foremen under whose supervision no lost-time accidents have occurred during 12 or more months ending March 31, 1953.

Name	Months	Name	Months
MINE 204		**HENDRIX MINE**	
Looney, Dewey	89	Akers, N. L.	109
Mullins, Victor	70	Webb, Drexel	72
Adams, Chas. L.	65	Collier, R. C.	66
Mink, W. P.	63	Scott, Palmer	64
Wetzel, Raymond	57	Plummer, Denver	39
Branham, Andy	44	Hollyfield, Jeff	39
Draughn, B. V.	42	Gray, Amos	37
Davis, Noll	39	Hollyfield, H. C.	36
Osborne, E. K.	38	Davis, J. B.	35
Edwards, Dallas	31	Davis, W. E.	34
Stanley, Estle	30	Childers, Hershel	33
Berry, Glen	28	Whited, J. R.	32
Webb, Bill	18	Nelson, Fritz	32
Blevins, Holly	16	Boggs, Ed	29
Dotson, E. G.	16	Cox, Estil	29
Medding, O. W.	14	Horner, Henry	28
Blanton, Bert	14	Higgins, D. C.	27
MINE 214		Johnson, James T.	24
Kyle, R. D.	101	Sparks, Henry	23
Fields, Charles M.	84	Adams, Chas. H.	23
Varner, Luther	67	Howard, Frank	20
Dorton, C. C.	65	Pass, Ted	20
Flint, Warnie, Jr.	62	Sergent, Wm. H.	20
Collins, Leland	57	Toth, Steve	19
Wright, Allard	47	Preston, Millard	19
Hall, H. C.	40	Flint, Lester	17
Arrington, John	29	Dann, J. C.	13
Howell, Cletis	28	**BEEFHIDE**	
Caudill, Estill	25	Coy, W. O.	35
Elliott, J. D.	20	Beckett, C. P.	29
Sanders, Jerry	17	**JENKINS CENTRAL PREPARATION PLANT**	
Collier, Henry	17	Bowers, H. C.	76
Mullins, James Estill	15	Robinson, Lloyd	30
Pass, Carl Berry	15	Greer, Goffery	26
Harrison, Wilson	12		
Jordan, W. O.	12		

NOTE: Company officials feel that, by rights, every employee and every instructor should be listed on an "Honor Roll" for his part in the record made.

dents for the 12-mo period ending Nov. 30, 1953, to make its employees eligible. A fatality shall automatically disqualify this group.

INDIVIDUAL REGULATIONS

1. Any employee, to be eligible, must be on the payroll continuously during the period Dec. 1, 1952, through Nov. 30, 1953.

2. An individual employee, to be eligible, must work at least 90% of the days the mine, plant or shop is in operation.

3. The individual employee, to be eligible, must complete the 12-mo period without having had a lost-time accident.

Coffee, coke and doughnuts are served at all accident-prevention classes. Graduation from the course is made quite an occasion. All employees and their families are invited, door prizes are awarded, and a free picture show is included. An effort is made to have top men of the state Department of Mines & Minerals, USBM and UMWA present at the ceremonies, where certificates from the Bureau and the UMWA (signed by John L. Lewis) are awarded.

SUPERVISORS RECOGNIZED

Foremen are awarded honors and material prizes for supervising their men without lost-time accidents for one or more years, with the awards presented at a fine annual banquet. Last year, the winning foremen were put up at the Campbell House, Lexington, and served a banquet at the Boiling Springs Country Club. Men with 1-, 2-, 3- and 4-yr records were given lapel buttons. To the 5-yr men went engraved Hamilton watches. Men achieving 6-yr records were given engraved watch fobs and $100 suits of clothes. Those with 7 and 8 yr received $150 luggage sets. N. L. Akers, holder of a 9-yr record, the highest to date, was awarded a $150 portable radio.

In addition to these awards, each foreman who has finished 2 yr or more without a lost-time accident receives an expense-paid trip to the American Mining Congress Coal Show at Cleveland or the Coal Division meeting at Cincinnati. As of March 31, 1953, the honor roll of foremen with 12 or more mo without a lost-time accident to their credit included 17 of the 21 foremen at Mine 204; 18 of 26 foremen at Mine 214; and 27 of the 31 at Hendrix mine. Two foremen, the total at the Beefhide operation, were on the honor roll, and three of the four at the Jenkins plant were similarly honored.

MECHANIZING WITH SAFETY

It is impossible to pin down a definite relationship between the degree of mechanization and the improved safety records at the Consolidation Coal Co. (Ky.) mines. In 1942 the production was mostly hand-loaded. Following that came a transition period, and at the beginning of 1948 all tonnage was mechanically loaded. Natural physical conditions in the mines affecting safety are not outstanding, one way or the other. For the most part, the working height has been 3½ to 5½ ft and the seams fairly level. Although all are drift mines, they are classed as grassy. Mine roof ranges from mostly excellent in Hendrix mine to very bad in Mines 204 and 214. Although mechanization increased the output per man, it is noteworthy that the improvement of approximately 75% during the last 6 yr has been mainly achieved in the past 3 yr of decided safety improvement.

The safety record at Hendrix Mine, under Wm. Stapleton, superintendent, deserves special mention. In May of this year, the mine was in its 19th month without a lost-time accident and in that time had mined over 1,000,000 tons of material and shipped approximately 850,000 tons of cleaned coal.

At the date of this report, Consolidation Coal Co. (Ky.) has mined over 4,000,000 tons of material and shipped over 3,390,000 tons of coal without a fatality.

Asked to sum up Consol's safety program, Mr. Prunty said: "Education and training are the means, but the key to real success is proving the company's sincerity and complete honesty in wanting safety for the good of the men and the prosperity of the company, which means security for the men."

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Foremen's Forum

Compressed Air at Low Cost

GOOD MAINTENANCE is the key to higher efficiency and lower costs in making and using compressed air . . . Here are some hints to help you get even more benefit from your air-operated tools, compressors, air lines.

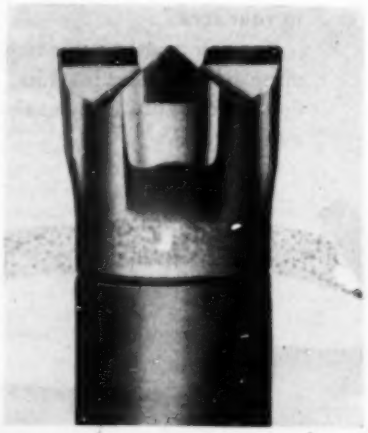
WHETHER YOU ARE A MAINTENANCE SUPERVISOR, a production foreman or a higher official at a mine where compressed air is used for any purpose, you have a stake in seeing that the highest possible efficiency is obtained from the pneumatic tools and from the air itself. Improving the service of this equipment is a real contribution to lower costs.

On the other hand, if you work at a mine which does not use compressed air, do not be too relaxed in reading this month's discussion. You may wake up tomorrow morning to find pneumatic equipment right in your lap, because roof-bolting, face preparation, shop-tool operation, overburden drilling and other mining jobs are more and more becoming applications where compressed air shows up to advantage. Furthermore, it wouldn't surprise us to see the old charging tank in new dress come back into the coal mines for powering certain shuttle-type transportation units. Nowadays, you could put one of the new portable compressors right alongside such a tank to eliminate long air lines, and you'd have a dandy little unit for changing cars behind a rock-loading machine, for example.

What brings this subject of compressed air to the fore is a small item in *Compressed Air Data*, an Ingersoll-Rand publication. The item points out that **if you have a ⅝-in leak in a 100-psi distribution system, you can lose more than $400 worth of compressed air per month.** The cost of producing the air is assumed to be a reasonable 6c per 1,000 cu ft.

With savings like this within the realm of possibility, it becomes worthwhile to have a few words on the proper care and application of compressed-air equipment, so let's look into some of the features and characteristics of effective drills and drill steel, and well-maintained compressors and distribution lines.

Starting with the bit at the face of the hole, we'll work back toward the compressor, discussing as we go proper practices and safety precautions as recommended by experts in the field.



GETTING THE MOST OUT OF BITS

When all's said and done, you can have air at the optimum pressure going into the best drill in the business, but if the bit is dull or improperly sharpened you won't get much work done. In fact, the punishment you should be inflicting upon the rock or coal will have to be absorbed in the drill parts or in the drill steel, thus shortening the life of the equipment while getting no useful work done.

Bit design is a precise science. Every angle, all clearances, all air or water ports, and each ounce of metal are there for a specific purpose. You can be sure there are improvements still to be made, but right now you have the best cutting tools that applied research, human ingenuity and years of experience can provide. For best results you have to keep them that way by maintaining an active interest in how they are treated in your own shop. You may find that some of your drilling troubles have their beginnings in the bit-sharpening shop. Know what the manufacturers say about sharpening and heat-treating methods, then make certain the recommendations are applied.

If you use throwaway bits, however, you still have the problem of determining the proper time to throw away the old one and put on a new one. Get all the service out of the bit but don't try to get too much. The man-hours you waste in trying to wear out coal or rock with dull bits may cost you a darn sight more than frequent bit changes.

For hints on air-powered rotary drilling, we might profitably look into the practices prevailing in metal-working shops. One of the axioms of machine-tool operation is: Keep the tool in the work. Don't let it chatter. If you do, you'll spoil both the tool and the work. We're not overly worried in the mines about spoiling the coal or rock, but chatter damage to bits can be costly. Like other precision instruments, bits are relatively expensive if their life is shortened through misuse.

KEEPING DRILL STEEL IN SHAPE

In percussion drilling the drill steel is one of the most important links in the chain of equipment, and the shank is one of the most important parts of the drill steel insofar as drill maintenance is concerned.

While drill steel is in use the shank actually is part of the drilling machine. It must be of the proper size and shape for the application, and more important, it must be of the proper hardness—not too

mechanically stronger sheath

greater resistance to fire, heat, oil, chemicals

firm, rugged assembly

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corrosion resistant conductors

higher breakdown voltages

maximum flexibility and toughness

Hazacord invites your comparison . . . for it's comparison alone that lets you see how HAZACORD QUALITY cuts costs on any flexible cord or portable cable installation.

Every Hazacord is protected by Hazard's exclusive Hazaprene ZBF sheath which means extra resistance to oils, acids, chemicals, moisture, weather. And the Hazaprene sheath is *cured under pressure in a continuous metal mold*—the best method known to provide "tire-tread" toughness with "snake-like" flexibility.

Like the rugged sheath, every Hazacord component—conductor, insulation and filler—is designed and made with the same skill. And every Hazacord, whether for light shop duty or tough mining operations, is assembled with precision and doublechecked for safety and performance even above rated capacity.

Compare Hazacord for quality—it's your best guide to longer-lived flexible cords and portable cables that mean *real* economy. Complete information on Hazard Mining Cables for all uses is contained in the 72 page booklet H-433; write for your free copy today. Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pennsylvania.

HAZACORD *Mold-Cured* **portable cables**

hard, not too soft, but just right. Hard shanks have a tendency to chip under the terrific stresses of percussion drilling. If you see sparks issuing from the chuck, stop the drill and change steels because the shank of the one in use is too hard. Just a small chip in the wrong place can chew up the inside of the drill.

Shanks which are too soft will upset under the hard pounding of the anvil block or piston.

Furthermore, be certain the shank is of the proper length. If it is too short it will not receive or transmit the full effect of the piston blow. Even with a sharp bit you'll get unsatisfactory drilling speeds if the length of the shank is off.

Then check the end of the shank. It should have a flat surface with rounded edges, and the flat surface should be perpendicular to the long axis of the steel. With properly-surfaced shank ends, the impact of the blow will be spread over the entire surface, thus saving wear and tear on the face of the piston or anvil block and eliminating one cause of drill-steel breakage.

Finally, be sure the hole in hollow drill steel is open all the way through, and where wet drilling is done be sure the hole near the shank end is straight and true to prevent damage to the water tube.

MAINTAINING PNEUMATIC DRILLS

Keep the sidebolts tight and don't tolerate a broken cushion spring in any percussion drill. With inexcusable defects like these, you'll get poor drilling efficiency and premature wearing out of the drill parts.

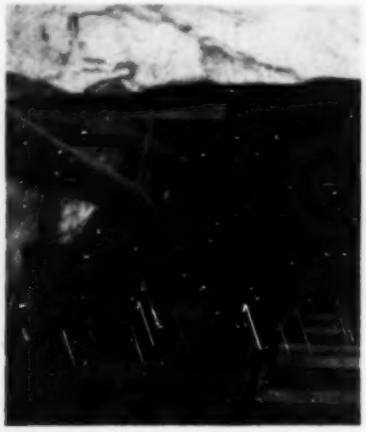
Periodically, check the condition of the inner parts of the drill. If they are excessively worn you'll get an off-center striking action similar to that resulting from using drill steel with improperly-ground shank ends. Immediately replace worn parts, and when you order a new piston you might as well include a cylinder front washer because your new piston will take a beating if the old front washer is worn. Check the chuck bushing once in a while, also, to be certain it is not worn to the point where it cannot hold the end of the shank square against the face of the drill's piston or anvil block.

You can check lubrication while the drill is in operation. If there is a film of oil on the chuck and on the shank of the drill steel, your lubricator most likely is doing all right. In these pneumatic drills, which reciprocate about 2,000 times per min, good lubrication is extremely important.

In applying pressure to the drill while it is in operation, equalize the "push" on both handles. That's how you keep the drill lined up with the steel to prevent off-center hammering on the piston and on the shank. And apply just enough pressure to keep the drill working like a beaver, not so much pressure that you slow it down.

You don't want any water on the surfaces of the operating parts inside the drill because it will wash away the lubricant. To keep it out, be sure to blow out the air hose before connecting it to the drill to remove condensation from the lines; and in wet drilling, be sure the water pressure is lower than the air pressure. Otherwise the drilling water will enter the air chambers in the drill.

Last but not least, don't throw the drill around. It is a precision tool.



DISTRIBUTING THE AIR

Two cardinal rules are (1) keep elbows and sharp bends out of the air lines, as much as possible, and (2) immediately repair any leaks which show up. We are assuming that you have inherited the air-distribution system you have in your mine or section, but if your experience indicates that restrictive piping is hurting your drilling efficiency, you might suggest some changes to the proper company authorities. In coal mines, compressed-air lines sometimes grow and grow without anyone realizing that pipe lines which once were adequate are now too small for the job. Manufacturers of pneumatic equipment will be happy to furnish down-to-earth data on pipe-line design.

Take good care of air hoses. Stow them in a safe place when they are not in use, and above all, don't let equipment run over them. Blow them out before they are connected to the drill and again before they are disconnected for storage. Compressed air is valuable; don't waste it through poor pipe-line maintenance.

On Getting Ideas . . .

IN 1614, JOHN NAPIER of Scotland wrote this:

"Seeing there is nothing, right well beloved students of mathematics, that is so troublesome to mathematical practice, nor doth more molest and hinder calculators, than the multiplications, divisions, square and cubical extractions of great numbers, which besides the tedious expense of time are for the most part subject to many slippery errors, I began therefore to consider in my mind by what certain and ready art I might remove these hindrances."

The result of Mr. Napier's consideration was the invention of logarithms, a noteworthy milestone in the history of mathematics.

★ ★ ★ ★ ★

Finally, you might try a test like this at your mine. Some idle day, when all air outlets should be turned off, check the operating cycle of the main compressor. On such days the compressor runs primarily to make up leakage losses, and the power consumed in such pointless work may be surprising.

GUARDING THE COMPRESSOR

Maintain clean conditions around the air intake of the compressor. Dust, dirt, steam and other foreign materials can raise havoc in the compressor's "innards."

Proper lubrication means not too little nor too much. Excess lubricant, or lubricant of higher-than-specified viscosity, will result in carbon deposits. You don't want hot carbon particles running through the system in company with volatiles from the lubricant. That could happen if you are not careful in lubricating the unit and in properly maintaining its cooling system.

In these two pages we have been able to give you only a taste of the recommendations covering compressed-air practices. Pick up some of the available literature—you will find it interesting and profitable reading.

JENKINS PRACTICAL PIPING LAYOUTS **63**

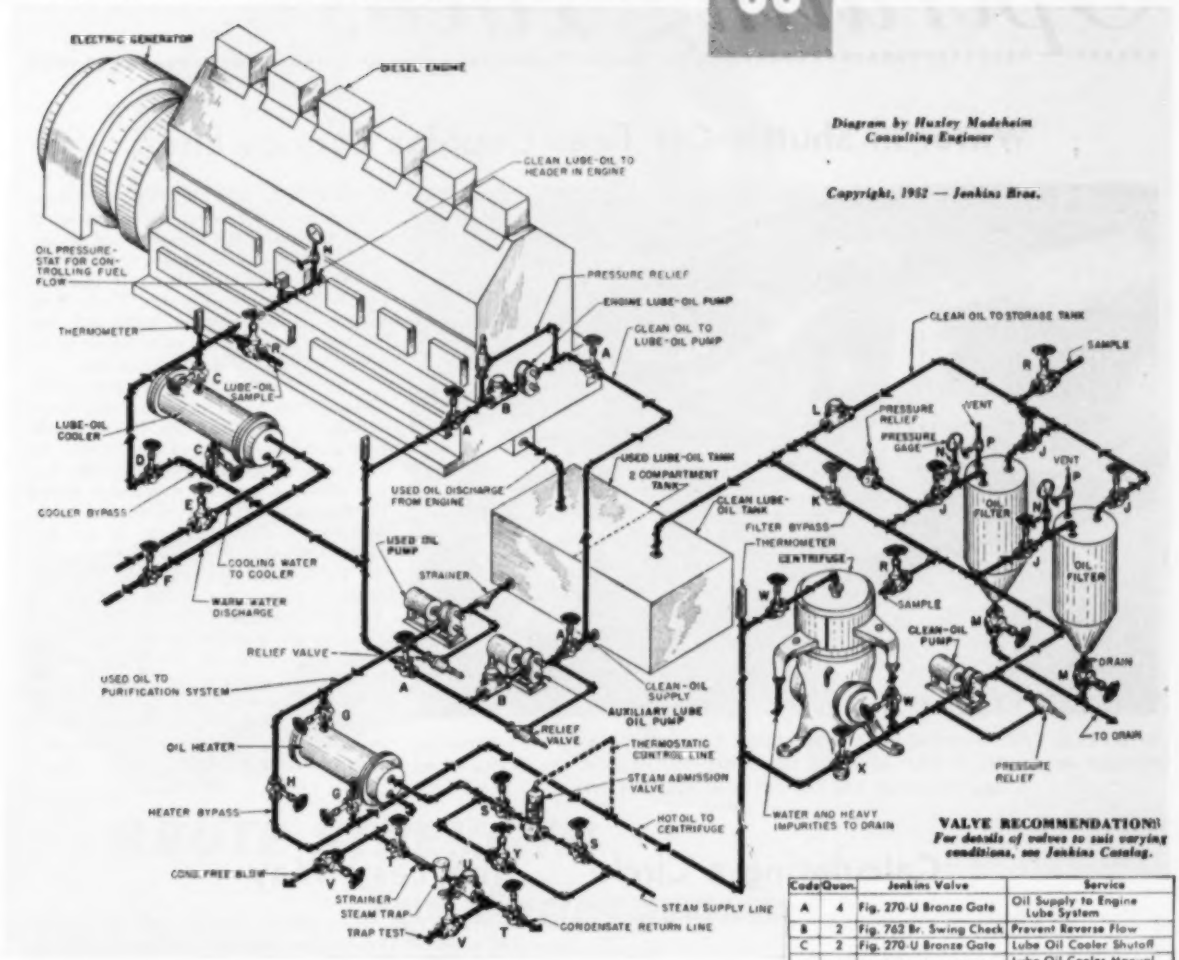


Diagram by Huxley Madeheim Consulting Engineer

Copyright, 1952 — Jenkins Bros.

VALVE RECOMMENDATIONS
For details of valves to suit varying conditions, see Jenkins Catalog.

Code	Quan.	Jenkins Valve	Service
A	4	Fig. 270-U Bronze Gate	Oil Supply to Engine Lube System
B	2	Fig. 762 Br. Swing Check	Prevent Reverse Flow
C	2	Fig. 270-U Bronze Gate	Lube Oil Cooler Shutoff
D	1	Fig. 270-U Bronze Gate	Lube Oil Cooler Manual Bypass
E	1	Fig. 950 Bronze Globe	Cool Water Supply to Lube Oil Cooler
F	1	Fig. 270-U Bronze Gate	Water Discharge Shutoff
G	2	Fig. 270-U Bronze Gate	Oil Heater Shutoff
H	1	Fig. 270-U Bronze Gate	Oil Heater Manual Bypass
J	4	Fig. 270-U Bronze Gate	Oil Filter Shutoffs
K	1	Fig. 270-U Bronze Gate	Oil Filter Manual Bypass
L	1	Fig. 762 Br. Swing Check	Prevent Reverse Flow
M	2	Fig. 950 Bronze Globe	Filter Drains
N	3	Fig. 743-G Br. Needle	Pressure Gage Control
P	2	Fig. 950 Bronze Globe	Filter Air Vents
R	3	Fig. 950 Bronze Globe	Oil Sampling Take Offs
S	2	Fig. 270-U Bronze Gate	Steam Supply to Oil Heater
T	2	Fig. 270-U Bronze Gate	Condensate Shutoffs
U	1	Fig. 762 Br. Swing Check	Prevent Condensate Backflow
V	2	Fig. 950 Bronze Globe	Condensate Bypasses Free Blow Trap Test
W	2	Fig. 270-U Bronze Gate	Centrifugal Shutoff
X	1	Fig. 270-U Bronze Gate	Centrifugal Bypass
Y	1	Fig. 956 Bronze Globe	Bypass on Automatic Steam Valve

How to plan a LUBRICATION OIL PURIFYING SYSTEM FOR DIESEL ENGINES

Lubrication oil purification systems are used on practically all modern diesel engines to assure longer oil life and decreased engine maintenance. Purification, however, must be accomplished without removing beneficial oil additives which increase lubricant efficiency and preserve bearing surfaces.

The diagram above shows a typical lubrication oil purification system designed to meet diesel engine needs. Circulated oil from the engine is returned to a tank and part or all of it is pumped through a heater. Here, it is raised to optimum cleaning temperatures. A centrifuge then removes water and impurities. The partially cleaned oil next passes through filters, where light impurities and colloidal carbon are removed.

In normal operation of the diesel, the lube-oil enters a clean oil storage tank, after which it is pumped back to the engine through a cooler, generally a shell and tube heat exchanger with water as the coolant, which reduces oil temperature raised during purification.

Consultation with accredited piping engineers and contractors is recommended when planning any major piping installations.

To save time, to simplify planning, to get all the advantages of Jenkins specialized valve engineering, select all the valves you need from the complete Jenkins line. It's your best assurance of *lowest cost in the long run*. Jenkins Bros., 100 Park Ave., New York 17.

Complete description and enlarged diagram of this layout free on request. Includes additional detailed information. Simply ask for Piping Layout No. 63.

JENKINS VALVES
LOOK FOR THE DIAMOND MARK
SINCE 1864 JENKINS
Jenkins Bros.

Operating Ideas

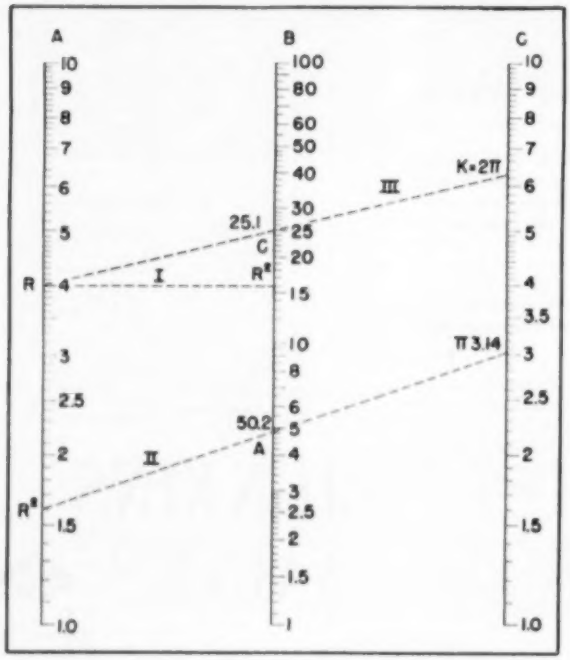
Water in Shuttle-Car Tires Doubles Service Life

SHUTTLE CAR equipped with water-filled tires discharging to a mine-car elevator in the No. 9 drift of No. 5 mine, Red Parrot Coal Co. Water-filling has increased tire life 100% at this property.

NUMEROUS MINES with shuttle-car haulage now are using water instead of air in tires, with the sole object of obtaining better tire life. Improved tire service follows because it is easier to maintain proper pressure with water. There is no leakage or necessity for refills and thus the value cap can be soldered on to insure that none of the water is lost.

Reports on better tire life with water as compared to air cover a wide range, depending upon tire loads, bottom conditions and cooperation of the drivers. An improvement of 100%—double the former life—has been the experience during the first year with water-filled tires in the No. 9 drift of No. 5 mine of the Red Parrot Coal Co., Prenter, Boone County, W. Va. The cars are Joy 6-SE 4-wheel-drive, 4-wheel-steer units carrying an average of 3 tons. Tires are 12-ply, 8.25x 15. They are mounted on the wheels and filled with water at the plant of the Goodyear distributor in Charleston, W. Va. After the tire is full of water and all the air is bled off, water pressure is brought up to 27 lb and the valve cap is then put on and soldered.

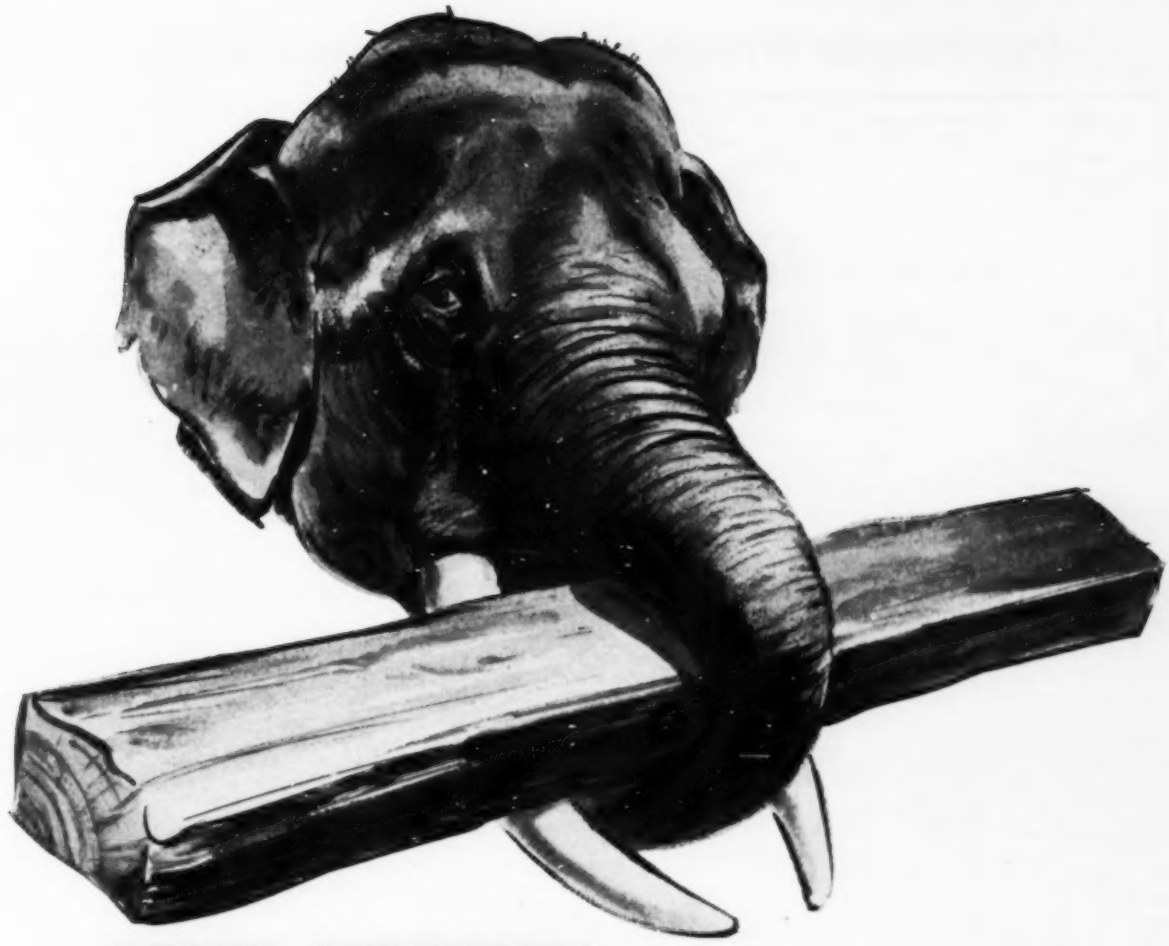
Calculating a Circle . . . the Easy Way



HAVING TROUBLE remembering how to find the circumference of a circle? How is your memory on how to find the area of a circle? If your memory is a little fuzzy and you would like a simple way to find areas and circumferences, this chart furnished by Carl P. Nachod, vice president, Nachod & U. S. Signal Co., Louisville, will help you.

If you want the circumference of a circle whose radius is, say, 4 ft, select the radius (4) on Scale A and draw a line to K on Scale C. The value for the circumference is the point of intersection between the line you drew from Scale A to Scale C and the line on Scale B. You should read 25.1 ft for the circumference of the circle.

If you want to find the area of a circle, the procedure is equally easy. You probably remember that the radius must be squared in the process of finding the area of a circle. If you don't like arithmetic you can find the square of the radius on the chart and then find the area. Using the radius, 4 ft, as before, proceed as follows: From 4 on Scale A draw a line at a 90 deg angle to meet Scale B. This point of intersection is the radius squared (R) and is shown to be 16. Next step in finding the area is to take the value for R and mark it on Scale A. You will note that it is located one scale division above 1.5. Don't let this confuse you because the values shown on the scales are relative with regard to decimal points. To further illustrate, suppose your radius was 50, then R would be 2,500 and the point on Scale A would be selected as 2.5. To complete the process of finding the area, draw a line from your R (16) on Scale A to (3.14) on Scale C. The point of intersection between this line and Scale B is the area of your circle—50.2.



BRUTE STRENGTH
For Underground Handling

THANKS TO BATTERY POWER!

Battery power gives shuttle cars tremendous capacity for continuous work. Enabling cars to operate full shift without downtime, it is the most economical, most dependable shuttle car power available today. Battery-powered shuttle cars move more tons more miles, move it faster and at lower cost, give you safety unequalled by any other type of power. If you really want to beat the high cost of moving coal from face to discharge station, use Gould Battery power!

Specify
THE GOULD "THIRTY"—
America's Finest
Mine Shuttle Car Battery

GOULD INDUSTRIAL BATTERIES

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, N. J.

Always Use Gould-National Automobile and Truck Batteries

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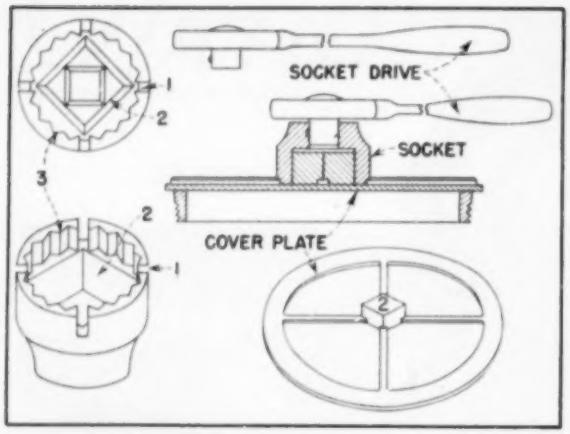
Dual-Purpose Wrench Aids Electrical Maintenance



REMOVING INSPECTION PLATES from motors and electrical equipment is simplified by use of a dual-purpose socket wrench designed and made by Gus C. Stefanick, former mine mechanic and now a foreman at Grant Town, W. Va. The socket was made from a solid piece of iron machined to the proper size. First the four slots or notches (1) were cut equidistant apart around one end of the socket. Then the opposite end was made to hold a ¾-in drive. This tool served to remove covers and inspection plates from motors and electrical equipment. However, a second socket or wrench was needed to remove covers that had raised square centers. To eliminate this second tool, Mr. Stefanick removed the center from the socket and shaped it to fit the lids with the square center (2). This addition permitted removal of all types of lids on electrical equipment. As a final step, the socket was altered (3) so that it could be used for loosening or tightening various sizes of hexagonal bolts or nuts.

The socket has saved a great deal of time in electrical maintenance and can be used for general maintenance work, Mr. Stefanick reports.

How to Adjust the Specific Gravity of Repaired Batteries

WHEN IT BECOMES NECESSARY to adjust the specific gravity of the electrolyte in an industrial storage battery, a job you might have if for any reason some of the electrolyte is lost, the engineers of Gould-National Batteries, Inc., suggest that you follow these recommendations:

1. Use only sulfuric acid which has been specified for storage-battery use. You can get it from any of the larger manufacturers of sulfuric acid.

2. If the decrease from normal specific gravity is slight, 15 points or less, acid of 1.300 sp gr may be added instead of water for several additions over a period of time until the electrolyte comes back up to the proper gravity.

3. To raise the gravity more than 15 points, remove some of the electrolyte from the cell and replace it with acid of 1.400 sp gr. After the normal charge, keep the cell on charge at the finishing rate while adjusting the acid so that the evolved gas will stir and mix the acid with the remaining electrolyte. This will take from ½ to 1 hr for complete mixing.

4. If the specific gravity of a fully-charged cell is found to be above normal, adjust downward by removing some of the electrolyte and replacing it with pure water. Guard against specific gravity above 1.310 to avoid injury to the battery.

And here are some tips to guide you in mixing and adding acid.

The amount of 1.280 electrolyte required per cell may be determined by multiplying the number of positive plates in the cell by the constant in the right-hand column of Table I.

Sulfuric acid for storage batteries usually is sold in specific-gravity concentrations of 1.835 or 1.400. To change the specific gravity to another value, it is necessary to mix the acid with pure water. **Always add the acid to the water and not water to the acid when mixing.** Add the acid in small amounts while stirring constantly. Heat develops during this operation, so cool the mixture by 100 F or below before adding it to the cell. Pouring a hot mixture into the cell may damage the cell.

For example, in using Table I, if you have cells with a capacity of 40 amp-hr per positive plate, multiply the number of positive plates in the cell by 1.6 to find the weight of 1.280 electrolyte required in each cell.

Use Table II in determining the proportions of water and acid you should use to obtain electrolyte of the desired specific gravity.

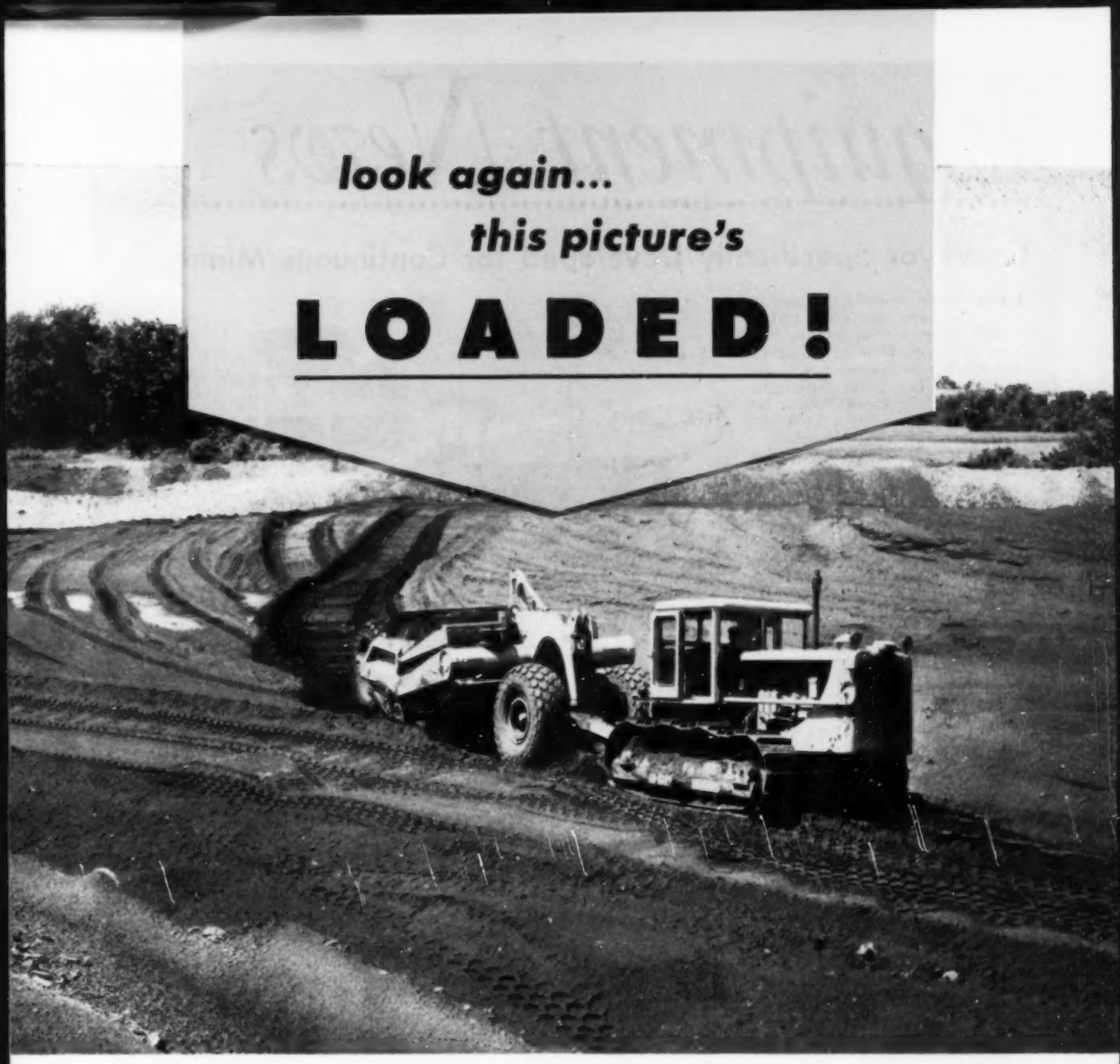
To use Table II, find your desired specific gravity in the center column; then if you have acid of 1.835 sp gr, use the proportions in the left-hand column. If you have acid of 1.400 sp gr, use the proportions in the right-hand column.

Table I—Electrolyte Required in Batteries of Various Capacities

Battery Capacity, amp-hr per positive plate	Electrolyte Required, lb per positive plate, 1.280 sp gr
34	1.6
40	1.6
55	2.3
100	5.0

Table II—Water-Acid Mixtures Required to Obtain Electrolyte of Various Specific Gravities

—Mixing by Volume Using 1.835 Acid— Parts Water to Required	Part Acid Required	Specific Gravity Desired 77 F	—Mixing by Volume Using 1.400 Acid— Parts Water to Required	Part Acid Required
1.78	1	1.375	.075	1
1.86	1	1.365	.11	1
1.94	1	1.355	.14	1
1.975	1	1.350	.16	1
2.08	1	1.340	.20	1
2.17	1	1.330	.24	1
2.22	1	1.325	.27	1
2.33	1	1.315	.31	1
2.42	1	1.310	.33	1
2.52	1	1.300	.38	1
2.65	1	1.290	.43	1
2.70	1	1.285	.46	1
2.79	1	1.280	.49	1
2.84	1	1.275	.53	1
2.92	1	1.270	.56	1
3.10	1	1.260	.63	1
3.18	1	1.255	.67	1
3.26	1	1.250	.70	1
3.38	1	1.245	.74	1
3.46	1	1.240	.78	1
3.67	1	1.230	.85	1
3.80	1	1.225	905	1
3.91	1	1.220	.96	1
4.03	1	1.215	1.00	1
4.15	1	1.210	1.05	1
4.26	1	1.205	1.11	1
4.43	1	1.200	1.16	1



This is a revealing picture of the self-loading action of the Cat* No. 80 Scraper. It was taken at Leesport, Pa., where the scraper and its running mate, a Cat D8 Tractor, are dredging coal from a river bed and hauling it to a preparation plant for cleaning.

No. 80 Scrapers are engineered and built for just such jobs as this. Efficient cable operation permits pumping of dead material for fast loading—and positive ejection gets rid of all material on the run. The open bowl of the No. 80 makes a big target for shovels. Simple design and rugged construction provide extra-long life with minimum down time.

Your Caterpillar Dealer is with you all the way when you get one of these big, yellow machines. He has a full stock of genuine parts, and offers friendly, efficient service. Ask him to come out and give you an on-the-job demonstration. He'll be glad to do it.

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

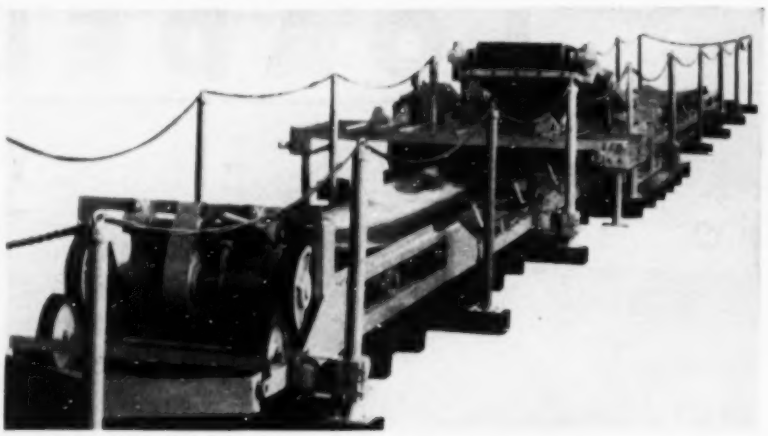
*Both Cat and Caterpillar are registered trademarks—®

**NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE**

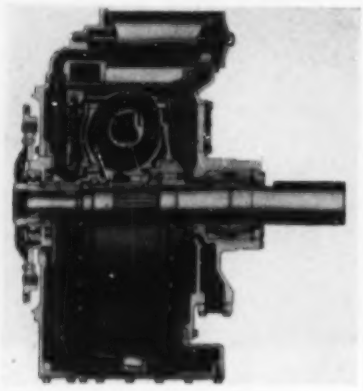
Equipment News

Conveyor Specifically Developed for Continuous Mining (1)

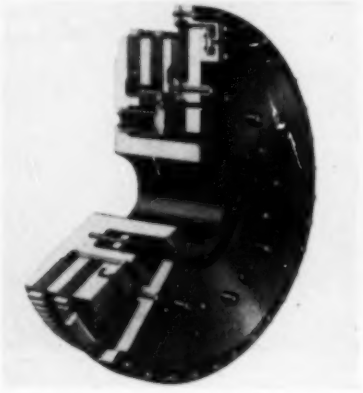
A new shuttle conveyor designed for use with continuous miners, and said by the maker to provide the "missing link" in continuous operation by filling the final gap in the mechanized flow of material from the face to the surface, has been announced by Hewitt-Robins, Inc. Extensible to 600 or 700 ft by a rope haul, the new conveyor maintains a fixed discharge or transfer point while following mining to receive material directly from the mining machine or from an intermediate unit. Proper conveyor alignment is assured either by small guide rollers fixed to roof jacks alongside the conveyor frame or by use of track, and the unit can be operated in headroom as low as 30 in, it is said. With a minimum belt width of 24 in, the conveyor handles up to 250 tph and is made in lengths up to about 500-ft centers. The 8-ft intermediate sections are each equipped with rubber-tired antifriction-bearing wheels and a covered deck to protect the return belt and are easily assembled by connecting pins. Mechanisms located at the fixed-discharge point and activated by push-button controls drive the conveyor, move it forward and backward, and tension the belt.



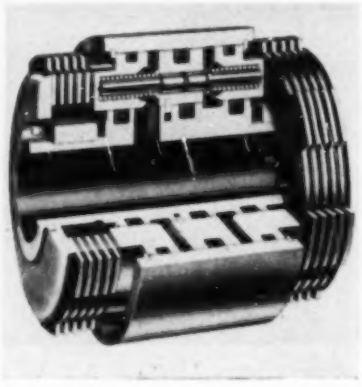
Circle No. 1 on the postage-free card facing p 120 for full details on this new type unit from Hewitt-Robbins, Inc., Stamford, Conn.



TWO-STAGE torque converter.



MODEL PO air-actuated clutch.



OIL-ACTUATED multiple-plate clutch.

Friction and Hydraulic Drives Boost Performance (2-6)

Five new drives to help increase performance, extend utilization and reduce maintenance of both engine- and motor-powered equipment have been announced by the Twin Disc Clutch Co., as follows:

(2) Two-Stage Torque Converter, said to offer new performance characteristics to fill the gap in industrial hydraulic drives. Features are: (1) up to 4:1 torque multiplication at stall—delivers greater performance from present engines; eliminates engine lugging and torsional vibrations; reduces gear shifting and clutching; decreases operator fatigue; (2) operating economy with minimum cooling requirements—accomplished through exclusive free-wheeling guide stage, permitting engine to be completely unloaded under high-speed no-load conditions; (3) progressive increase in engine speed and uniform pulldown under load—engine rpm progresses evenly during acceleration; decrease of engine rpm during load increase is uniform.

Basic unit is the Model S with two types of output shafts: (1) straight-shaft extension, and (2) flanged shaft, permitting use of U-joint connection for inline drives. In the disconnecting type, bearing the designation SD (illustrated), the unit incorporates quick-release dump valves on the turbine wheel and a two-position control valve. Length of the SD is said to be less than a converter equipped with the conventional friction clutch.

(3) Model PO Air-Actuated Clutch is described as a remotely-controlled friction drive lighter in weight and narrower in width than the conventional air clutch. Offered at present in two- and three-plate 24-in sizes, the unit is said to provide even greater torque capacity though

41% more drilling per bit

(Full data on request)

Face preparation costs at Leechburg Mining Company's Park-Armstrong Mine have been substantially reduced by use of Kennametal bits. Their remarkably hard sintered carbide tips consistently drill over 40% greater footage than any other carbide used here. Kennametal averages 150 feet per sharpening in the mine's medium hard coal and effectively penetrates the occasional sulphur balls encountered.

Kennametal sintered carbide bits regularly outperform other carbides for this reason: Kennametal stays sharp longer, takes harder knocks than any other tungsten-carbide. Your Kennametal representative—a man with years of actual mining experience—will gladly show you how the proper Kennametal bit can lower drilling or cutting costs in *your* mine. Call him anytime.

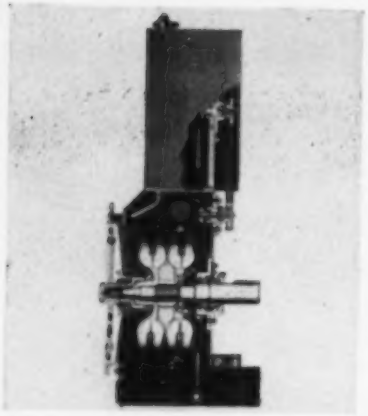
Look for the name of your Kennametal Representative in the yellow section of your phone book, or on the back of your Kennametal Price Book — or, write direct.

WORLD'S LARGEST MANUFACTURER OF TUNGSTEN-CARBIDE

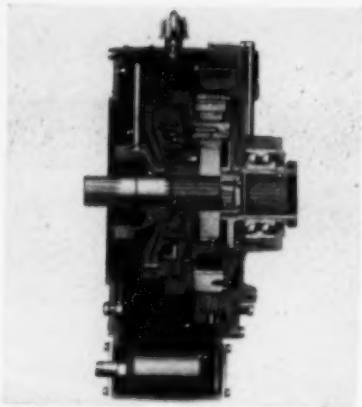
DRILL BITS, CUTTER BITS, ROOF BITS, STRIP BITS

KENNAMETAL®

KENNAMETAL INC., MINING TOOL DIVISION
BEDFORD, PA.
GENERAL OFFICES and MAIN PLANT, LATROBE, PA.



DISCONNECTING hydraulic power takeoff.



TWO-SPEED oil-actuated transmission.

designed for minimum size and inertia mass.

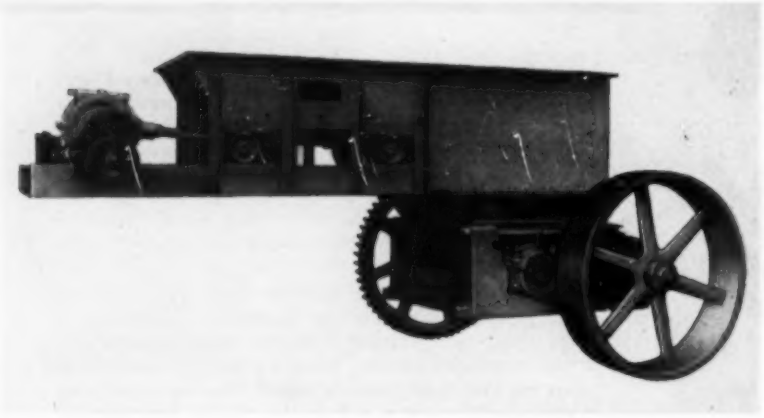
(4) Oil-Actuated Multiple-Plate Clutch features simple precision-engineered design with integral construction of oil-actuated cylinder and clutch mechanism, thus providing longer adjustment-free plate life, higher torque capacity, and push-button remote control at less cost. No adjustment is required to compensate for friction-plate wear, the company points out, and the torque capacity for a given oil pressure is always a constant. These two features, it is stated, often make it possible to use a smaller clutch.

(5) Disconnecting Hydraulic Power Takeoff is stated to reduce impact shocks 70%, and is described as a more-effective hydraulic linkage for heavy-duty applications requiring quick, positive disconnecting of the power source from the driven equipment. The unit, according to the company, provides more-effective use of peak engine torque and a "cushion" against starting and stopping shocks and overloads. Designated as the Model HUD, the unit acts as a master clutch. Reduction in impact shocks assures greatly reduced maintenance costs and longer, more-serviceable, trouble-free equipment life. Available in coupling sizes 21 to 27 in for engines up to 600 hp.

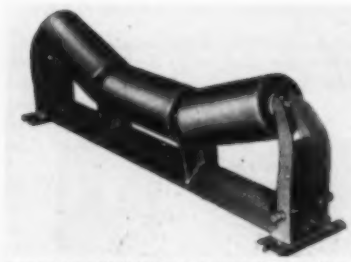
(6) Two-Speed Oil-Actuated Transmission is designed to permit three-stage torque converters to deliver extended performance within their maximum operating range. This Model T-302 transmission provides two ratio speeds: direct drive and 2.69:1 reduction, or direct drive and 3.07:1 reduction. Greater shifting ease, the company states, is provided by hydraulically operated multiple-disk clutches providing neutral, high or direct drive, and low or reduction-gear drive. Small and rugged, the unit is said to be designed for easy installation and simple maintenance. As a package unit, it is matched to the Twin-Disc three-stage hydraulic torque converter.

Complete data on the units may be obtained by circling the respective numbers on the postage-free card facing p 120 or as follows: (2) two-stage hydraulic torque converter, (5) disconnecting hydraulic power takeoff, and (6) two-speed transmission, Twin Disc Hydraulic Division, Rockford, Ill.; (3) air-actuated clutch and (4) oil-actuated multiple-disk clutch, Twin Disc factory, Racine, Wis.

Plate Feeder Offers Capacities to 500 TPH (7)



New McLanahan Model HDF reciprocating plate feeder has a capacity range up to 500 tph and is recommended by the maker for feeding all sizes of materials. Employing the bottom-feed principle with capacity governed by speed and stroke of the reciprocating bottom plate, the unit is readily adaptable to any kind of crusher (as shown) or hopper, with the flow rate controllable to synchronize with the producing capacity of any machine, elevator, conveyor, etc. Power is delivered from the electric motor through V-belts to the Dodge Torque-Arm reduction unit mounted on the eccentric shaft. Various types of drives are available, including chain-and-sprocket drive from crusher or other equipment utilizing a jaw clutch that permits stopping the feeder without stopping the driving unit. Complete data from McLanahan & Stone Corp., Hollidaysburg, Pa.



BELT-CONVEYOR CARRIERS (8)

Designed for long trouble-free heavy-duty service and exposure to dust and weather, the Stephens-Adamson 220-series belt conveyor features spun end rolls and welded steel frame. Seamless-steel tube houses tapered roller bearing and is bored for precision alignment between roller diameter and bearing. Die-cast labyrinth seal protects bearing, which can be adjusted for proper clearance by taking up nuts supporting rolls in carrier brackets, and rolls can be lifted from frame for inspection without tools. Flexible high-pressure lubrication tubes can be arranged for three-shot lubrication from one or both sides of conveyor. Roller assemblies and parts are interchangeable. Bulletin 453 with full data from Stephens-Adamson Mfg. Co., Aurora, Ill.

NEW-TYPE RECTIFIERS CUT SIZE AND WEIGHT MARKEDLY (9)

Titanium-dioxide rectifier stacks, a new metallic-rectifier development, promises revolutionary improvement in performance of mine rectifiers, according to the manufacturer. Outstanding characteristics cited by the maker are ability to operate at higher temperatures without damage (up to 160 C) continuously, and the fact that there is no change with age in efficiency or voltage output. The new rectifiers contain no low-melting alloys or aluminum plates and are non-corrosive in damp or salt atmospheres. They are about one-half the size of a selenium

B.F.Goodrich

Ira Zeigler, truck driver for Pittshaw Trucking Co. examines the tread of a BFG Rock tire on his semi-trailer

"Better than any tires we've ever used," says coal hauler about BFG tires

THE Pittshaw Trucking Co. hauls coal from strip mines near Kittanning, Pa., to loading tipples eighteen miles away. Sixty-seven company trucks, tractors and trailers cover the distance under giant loads of coal—over rough, rock-strewn roads and often over no roads at all.

Here, certainly, is a chance for off-the-road tires to prove they can take rugged operating conditions and still give positive traction and long wear. "Without doubt," says Pittshaw Supt. Richard McGarvey, "B. F. Goodrich tires have proven to be better than any tires we have ever used." This is why Pittshaw's units are 98% equipped with BFG tires.

The Rock tires above are used on semi-trailers carrying extra-heavy loads. Husky cleats in the shoulders of these tires take non-slip bites in both forward and reverse. And Rock tires are built with the exclusive nylon shock shield. Layers of strong, elastic nylon cords stretch together under impact to absorb and distribute shocks and bruises, protect the tire body. You get this 4-way saving:

(1) more recappable tires and more hours of service per recap (2) more original hours of service (3) increased bruise resistance (4) less danger of tread separation. All these advantages, yet the nylon shock shield costs you nothing extra. It's found in all tires of 8 or more plies—*double* nylon shock shield in larger sizes.

See the complete line of cost-cutting tires at your BFG retailer's store. You'll find the address under Tires in the Yellow Pages of your phone book. Or use the coupon below.

Specify B. F. Goodrich tires when ordering new equipment

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER

The B. F. Goodrich Co.
Dept. TO-151, Akron, Ohio

Please send me:

- ☐ name of my nearest retailer
- ☐ free catalog on off-the-road tires
- ☐ free book, "How to get more recaps out of truck tires".

Name _____

Company _____

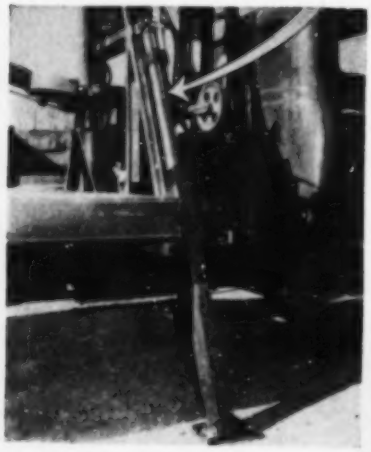
Address _____

City _____ Zone ____ State _____

stack of corresponding power and weigh about one-third as much, but the life is considered unlimited. Full data from Laboratories Div., Clark Electronic Corp., Box 165, Palm Springs, Calif.

COATING SEALS MINE ROOF (10)

A new mine-roof coating said by the maker to penetrate rock strata and form a lasting seal against mild seeping water and moisture can be sprayed with any type of spray equipment or painted on. Called "Das-Seal," it does not contain Portland or other types of cement, is non-toxic and non-inflammable, and can be applied to damp as well as dry surfaces with equally efficient results, the maker reports. Full details from the manufacturer, the Dasco Chemical Co., Baltimore 31, Md.



HYDRAULIC TRUCK OUTRIGGERS (11)

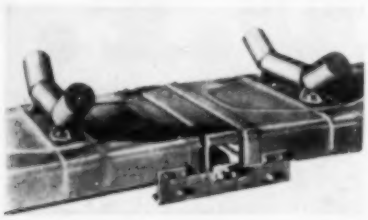
Hydraulically-operated outriggers now are available as optional equipment on the Model "B" Pitman Hydra-Lift truck-mounted crane with loadline capacity of 6,400 lb and power-swinging boom which telescopes from 12 to 22 ft. With the outriggers hydraulically powered, an operator can raise and lower the outrigger legs instantly simply by manipulating controls at his regular operating station, thus speeding up jobs where outriggers must be used frequently and stimulating their use as a safety feature. Hydra-Lift, with a boom swing of 180 deg, requires but 40 in for installation behind the cab of a truck, leaving the balance of the chassis for normal hauling purposes, the maker points out. Full information from the Pitman Mfg. Co., Kansas City 14, Mo.

NEW-TYPE LUBRICANTS (12)

New Solnus Oils, designed to give more lubrication per dollar, are being produced by Sun Oil Co. in a new multi-million dollar plant. These oils have excellent time-temperature characteristics and can be applied by any method, the company says. Applicable to wide range of industrial equipment, they feature excellent performance for longer periods, continuous protection against rust and corrosion, high efficiency and maximum economy. Full details in Sunoco Technical Bulletin No. 17 from Sun Oil Co., Philadelphia 3.

35-TON HYDRAULIC JACK (13)

A new 35-ton hydraulic jack, said by its maker to be the first of its kind in the jack-manufacturing industry, has been announced by Duff-Norton Mfg. Co., Pittsburgh 30. Weighing 55 lb, with a height of 9.7 in and a power lift of 6 in, the unit offers various features, including: patented automatic air vent, said to eliminate 90% of "air lock" difficulty; 25% lighter weight than other types with same capacity; air-vent screw and bothersome adjustments eliminated; and single pump with longer stroke giving more rapid lift with less pumping. Bulletin AD 29 from company gives full details.



TROUGHING IDLERS (14)

New M & C line of idlers and return rollers are available in a full range of sizes. The trough belt roadway conveyors are made of close-grained cast iron for greater resistance to abrasion and corrosion with closed ends to keep out dirt and specially made SKF ball bearings and method of mounting that reduce friction to a minimum. The return idlers are made of seamless steel with smooth finish. Complete information from Hambro Machinery Div., 17 E. 54 St., New York 22.

Equipment Shorts You'll Want to Check

(15) MINE MAINTENANCE, and equipment installation are facilitated with the Lug-All Model 3000-HD winch-hoist which handles 1½ tons in any direction yet weighs only 8¾ lb, the maker says. An unusual built-in pulley block permits work around corners and as close as 10 in. The hoists also are available in ¾- and 1⅛-ton sizes, with a number of useful accessories. Bulletin 116 offered by Lug-All Co., Wynnewood, Pa.

(16) SAFETY HAT—Called a new departure in protective headgear by the maker, Willson Products, Inc., Reading, Pa., the "Super-Tough Hat" differs from other hard hats principally in that the shell is molded in one piece of lightweight, moistureproof plastic, passing all required tests for impact-resistance, pierce-resistance and dielectric strength; also resistant to many industrial acids and caustics. The hat is made in two weights of plastic, in five colors. Details from the company.

(17) NEW PLASTIC PIPE — Waljohn Plastics, Inc., Industrial Div., Brooklyn 9, N. Y., has entered into the plastic-pipe field with the manufacture of "Walpipe." Formulated of all-virgin Tenite II, this rigid-type plastic pipe is made according to stringent engineering specifications with molded fittings to match. Booklet, "Facts You Should Know About Plastic Pipe," discussing applications and properties, is available from company.

(18) HEAVY-DUTY AIR HOSE especially developed for difficult service in mines, quarries and construction, etc., is available in lengths up to 50 ft and in inside diameters from ⅜ to 2 in. Known as Qua-Flex, the hose features horizontally braided rayon cable cord reinforcement to withstand working pressures as high as 450 psi, yet remain flexible at temperatures as low as minus 40 F; a non-porous tube of special rubber to withstand

both oil and heat; and an extra-thick wrapped rubber cover to resist abrasion, weather-checking and oil. Details from Quaker Rubber Corp.; Div. of H. K. Porter Co., Inc., Philadelphia 24.

(19) FOR WELDING MILD STEEL, new Airco 78E electrode offers deep penetration without undercutting, a minimum of spatter, uniform weld deposits without fingernailing, and a quickly solidifying deposit which especially adapts this electrode for welding in vertical and overhead positions. Complete details from Air Reduction Sales Co., New York 17.

(20) LABORATORY JAW CRUSHER announced by Denver Equipment Co., Denver 17, Colo., is a 3¼x4½-in force-feed unit operating at from 350 to 425 rpm and powered by a 2-hp motor. Overall dimensions are: length, 18⅝ in; width, 10⅝ in; height, 17 in. Capacity is 500 lb per hour of minus ¼-in material. It is primarily designed for laboratory or assay work where capacity normally is not the most important feature. Bulletin from the company.

(21) MERCURY LAMP—To fill the size gap between 400- and 1,000-w mercury lamps now on the market, the Westinghouse Electric Corp., Pittsburgh 30, has announced the A-H18 700-w mercury lamp. Giving 35,000 lumens initially and rated at 4,000-hr life, the new lamp further widens the possible uses of mercury lighting by providing a mercury lamp which is especially well suited to medium mounting heights, such as in street lighting, flood and general lighting applications. Data from company.

(22) RUBBER-TIRED TRACTOR for plant and yard work, the Hough Model TC-60 "Payloader" has a drawbar pull of 6,000 lb but is less than 5 ft high and 10 ft long, with an outside turning radius of only 10 ft 1 in. It has a forward speed range from 1.6 to 16.9 mph and a reverse speed from 1.8 to 19.0 mph and is powered by a 6-cylinder 67-hp gasoline engine. Details from the Frank G. Hough Co., Libertyville, Ill.

(23) SQUARE LOCKOUTS — Security Locknut Corp., Melrose Park, Ill., reports that Security Square Nuts and Rail-locs now are made with a finished base and counterbored and tapped-in fixtures so that the bolt is both centered and at right angle to the base. The bolt hole at the base has also been chamfered to assure easy starting and reduce thread damage to bolt and nut.

(24) HOSE LINES — Aeroquip Corp., Jackson, Mich., is now producing Aeroquip "Globe-Seal" hose lines made up with an Aeroquip detachable re-usable fitting, featuring a hose-fitting nipple that mates with the Ermeto- or Ferulok-type flareless tube connectors without need for ferrules or inserts. The new hose line is available in both the single and double wire braid types. The company also has announced a new-type fitting called the "Flex Joint," which not only serves to join two rigid tubes in a fluid-tight seal but also permits for the first time a considerable degree of flexibility between the two rigid tube ends that are joined.

THE POSTAGE-FREE CARD

. . . facing p 120 will bring you more details on any item in this section without obligation. Just circle the numbers, sign card and mail.

(25) SHOVEL-LOADER — New High Lift model of the Baker-Lull Shoveloader, designed for loading gondola cars, hoppers and trucks, has lifting heights to 16 ft, dumping heights to 14½ ft, and load capacities as high as 6,000 lb. Accessory tools available include a coal and snow bucket, a loose material bucket, a material bucket, and a crane hook, and the unit is mounted on four national makes of industrial wheel-type tractors: Case, Minneapolis-Moline, Sheppard and Oliver. The company also has announced that the combination of cheap diesel power with front-end loading up to 5,000-lb capacity now is available in the Baker-Lull Shoveloader mounted on a Sheppard industrial wheel-type tractor, with fuel cost savings up to 75% of gasoline-powered equipment, it says. Bulletins on both models available from Baker-Lull Corp., Minneapolis 20, Minn.

EQUIPMENT BULLETINS AVAILABLE

(30) IF YOU'RE CONCERNED WITH BELTS, you'll find use for a new 32-p manual on the installation and maintenance of conveyor and elevator belting published by The B. F. Goodrich Co., Akron, Ohio. More than 60 photographs and drawings illustrate ways to improve belt service and lengthen belt life. One chapter covers how to select belts, with a detailed review of the engineering information required to specify a new conveyor belt. Belt repair methods and belt splicing and fastening are covered in detail, and a special table lists common conveyor belt maintenance problems, the cause of each, and the best remedy. Other topics covered include ways to make conveyor belts run straight, the causes and effects of excessive tension, selection and installation of pulley lagging, ways to avoid belt wear at loading point, use of damage-preventing appliances, types of compensating idlers and the effects of defective idlers.

(31) FOR THE PREPARATION MAN, McNally Pittsburg Mfg. Corp., Pittsburg, Kan., has produced a 100-p "Coal Preparation Manual" containing a wealth of information, data and tables applicable to many phases of the coal industry. The manual is pocket-sized for handy reference to the wide range of data it contains.

(32) UNIVERSAL COAL CUTTER—12-p Catalog 531, offered by the Goodman Mfg. Co., Chicago 9, contains full operating details, specifications and dimension drawings on the new Goodman Types 2400 and 2410 rubber-tired universal cutting machines designed for efficient, high-capacity trackless mining.

(33) ROOF BOLTS—Bulletin offered by West Virginia Steel & Mfg. Co., Huntington, W. Va., covers its complete line of roof bolts and accessories, with full details of construction, sizes and installation practices.

(34) FOR SAFETY MEN, the National Safety Council offers a complete catalog of its many and varied accident-prevention aids available for building plant safety programs and instructing supervisors and workers. The 52-p guide describes the Council's periodicals, newsletters, a complete library of technical and administrative publications on all phases of accident prevention, training courses and full line of posters, films and booklets. Service Guide 2.1 available from the National Safety Council, Chicago 11.

(35) CABLE-REEL SHUTTLE CARS—Goodman Mfg. Co., Chicago 9, offers Catalog 532 covering construction and operating features of its cable-reel shuttle cars, in 42- and 48-in basic heights with elevating discharge, and 42 in with fixed-height discharge.

(36) MAINTAINING CONTROLS—What to look for in maintaining control equipment properly is told in new Manual 14X7612A entitled "Proper Maintenance of Control," released by Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. Besides giving helpful suggestions toward overcoming some of the most frequent difficulties common to most electrical control devices, the pamphlet has a handy control trouble-shooting chart for quick reference showing the symptom, possible cause and cure, and lists 26 suggested points for satisfactory preventive maintenance.

(37) MINING TOOLS—Nine new styles of carbide-tipped mining tools are featured and described in a new Catalog VR-482 released by Vascoloy-Ramet Corp., Waukegan, Ill. The new catalog covers the complete line, including two new auger drill bits, a new-style split-type roof drill, two new finger bits, and four additional cutter bits.

4-minute cycle cuts stripping time

One of Allyn Mann's DW21-No. 21 rigs spreads a big load of overburden. Positive ejection gets any type of material out of the bowl fast, in a Caterpillar Scraper.

Allyn Mann Construction Co., working on a 500,000-yard coal-stripping contract near Camrose, Alberta, Canada, speeds up the removal of overburden with Cat* DW21 Tractors and No. 21 Scrapers.

The big yellow rigs load up to 20 cu. yd. per trip and make 15 to 20 trips an hour on a haul of 900 to 1,200 feet. While the upper layer of material on this operation is easy to handle, there are 12 feet of blue clay on top of the coal, making tough digging.

W. Mortenson, Superintendent, says: "The equipment we formerly used cost us about $40,000 in two years. Our DW21s are going to save us a lot of money in repairs and earn much more than we thought possible."

The Caterpillar DW21-No. 21 combination is designed to build profits, eliminate accidents and down time. The full floating axle, hydraulic steering and positive cable controls are definite advantages in steady work production. And the scraper is designed for fast loading and clean spreading—the most important factors in cycle time.

Your Caterpillar Dealer has machines for prompt delivery and the service and parts to keep them working profitably. Ask him for an on-the-job demonstration that will *prove* what they can do for you.

Caterpillar Tractor Co., Peoria, Illinois.

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Please send me catalogs or further information about the items from the Equipment News Section whose numbers are circled. (July, 1953)

1	7	13	19	25	35	41	47	53	59	65	71	77	83
2	8	14	20	30	36	42	48	54	60	66	72	78	84
3	9	15	21	31	37	43	49	55	61	67	73	79	85
4	10	16	22	32	38	44	50	56	62	68	74	80	
5	11	17	23	33	39	45	51	57	63	69	75	81	
6	12	18	24	34	40	46	52	58	64	70	76	82	

In addition, please send me data on these OTHER products advertised in this issue (give name and page number) .....

.....

Name: (Print) ..... **Position** .....

Company .....

Address .....

NOT GOOD if mailed after Sept. 1, 1953

(30) SHAKER-CONVEYOR DRIVE—Design and operating features of the new Goodman Type L-14 shaker-conveyor drive designed for low coal are outlined in new Catalog 553 available from the Goodman Mfg. Co., Chicago 9.

(39) NEW NEMA MOTOR STANDARDS, passed by NEMA on May 19 and setting up new frame dimensions for AC motors from 1 to 30 hp, are covered in Bulletin GEA-5995 offered by the General Electric Co., Schenectady 5, N. Y. The publication compares the old with the new frame assignments for open-type polyphase, single-phase and wound-rotor motors, as well as totally-enclosed fan-cooled types.

(40) COAL-WASHING TABLE—Bulletin 32 from the Deister Machine Co., Ft. Wayne 4, Ind., gives complete information on its new Model LTH coal-washing table and covers its several new features, such as the Lifetime Anti-Friction Headmotion, special deck contour and a new riffling system for the fully automatic control of separation between coal and refuse.

(41) HOSE CARE—New bulletin, "Tips on Hose Care," tells what to do and what not to do in the use and storage of various kinds of rubber hose, including steam, fire, oil, gasoline, water, air, suction and sandblast hose. Offered by Hewitt-Robins, Inc., Buffalo 5, N. Y.

(42) DUST COLLECTORS for roof bolting, the Browning approved units operating on compressed air without other power, are discussed in bulletin issued by the Browning Dust Collector Co., Box 188, Gilbert, W. Va.

(43) BELTING—Scandinavia Belting Co., Newark 1, N. J., offers a bulletin describing properties and applications of its Scandura belting, a solid-woven textile belt with a surface coating of plasticized P.V.C. said to be fireproof and waterproof, and resist abrasion, gouging and ripping. Applications in coal mining abroad are illustrated.

(44) WATER NEUTRALIZATION—Bulletin from Water Neutralizing Co., Box 867, Terre Haute, Ind., outlines features and application of Wanuco units for handling acid water in coal-preparation plants.

(45) BELTLINE WEIGHING—Sintering Machinery Corp., Transportometer Div., Netcong, N. J., offers new Bulletin 301 with full data on the Transportometer line of continuous, automatic scales, including the Transportometer for installation on new or existing belt conveyor; Transportoweigher, a complete weighing and conveying unit; and Transportofeeder, a complete feed regulating, weighing and conveying unit.

(46) SOLIDS-HANDLING PUMPS—Galigher Co., P. O. Box 209, Salt Lake City, Utah, offers 20-p Bulletin PB-52 on its new line of Vacseal pumps available in all metal- and rubber-lined types for solids and acids handling, in sizes to 8 in and capacities up to 3,000 gpm.

(47) RUBBER PRODUCTS FOR MINING—Rotogravure brochure from Boston Woven Hose & Rubber Co., Cambridge, Mass., illustrates with case histories its products exclusively designed for the mining and allied industries. Applications and installations pictured include hose, conveyor belts, V-belts and tape.

(48) FLOTATION AGENTS—Revised edition of technical booklet on Hercules flotation agents, offered by Hercules Powder Co., Wilmington, Del., features a new table of pertinent shipping information, with each product described according to type, per cent concentration as shipped, appearance, etc. Also booklet gives brief descriptions of the flotation process and the functions flotation agents serve, information on flotation agents supplied by Hercules and a group of mathematical formulas used in flotation operation and control.

(49) CIRCUIT BREAKERS—How application of AB-1 circuit breakers reduce downtime and maintenance is discussed in Booklet B-5458 available from the Westinghouse Electric Corp., Pittsburgh 30. Actual cases, with savings given, show how the replacement of fused devices by AB-1 circuit breakers result in improved continuity of operation, and complete design, selection and operating details are provided.

(50) DIESEL-POWERED TRUCKS from 10- to 34-tons capacity, scrapers and loaders in the Euclid line, all powered by General Motors 2-cycle diesel engines are described in Booklet EGM-2 available from the Euclid Road Machinery Co., Cleveland 17. Various engine models, the Allison torque converter and torqmatic transmission also are illustrated and featured in equipment now powered by the GM 275-hp "6-110" engine.

(51) SILICONE RUBBER as an insulating material for wire and cable is discussed in new Bulletin CDS-12 entitled "Silicone Rubber: A New Insulating Material for Wire and Cable." A reprint of a recent article written by M. C. Noble, a G-E silicone engineer, the bulletin includes a full description of the processing of silicone rubber, its properties and applications. Available from the Chemical Div., General Electric Co., Pittsfield, Mass.

(52) ALUMINUM SHAKER CONVEYOR, the new-type Holzworth conveyor featuring lighter weight, easier handling and speedy installation, is described in new bulletin available from the Frontier Bronze Corp., Niagara Falls, N. Y.

(53) COAL DRYING—An automatic control system which provides uniform drying of washed coal prior to shipping is described in a new Engineering Data Sheet AED 110-1 issued by the Foxboro Co., Foxboro, Mass. Designed for the McNally-Vissac coal drier, the system regulates moisture content so that changes in coal input rate and initial water content of the coal will not affect final shipping weight.

(54) VERTICAL TURBINE PUMPS as an answer to many of industry's pumping problems are suggested by Worthington Corp., Harrison, N. J., in new Bulletins W-450-B39 and W-450-B41 now available. Varied applications are shown along with the four basic features, minimum floor space, drive unit remote and separate from pumping element, mechanical and hydraulic flexibility, and minimum alignment problems.

(55) DUMP-TRUCK BODIES—Marion Metal Products Co., Marion, Ohio, has introduced a new company publication called *Dump Body Business* designed to fill the need for specialized news coverage of the dump-body and hydraulic-hoist field. Issued on an every other month schedule, it is available on request to truck dealers and operators and others interested in dump bodies.

(56) V-BELT SHEAVES AND HUBS—

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Specification Guide 83 giving dimensions and weights of its line of QD V-Belt sheaves and hubs is available from Fort Worth Steel & Machinery Co., Box 1098, Fort Worth, Texas. Included are construction features, applications and detailed specifications.

(57) STEEL SHELVING, lockers and other storage and maintenance equipment for industrial use are featured, with prices, sizes, etc., in new 32-p catalog offered by Precision Equipment Co., Chicago 41.

(58) FLUORESCENT LUMINAIRES for commercial and industrial uses are covered in 24-p Pocket Catalog B-5799 available from the Westinghouse Electric Corp., Pittsburgh 30. Detailed descriptions tell where the respective types are best applied, models available, features, dimensions and prices. A 4-p table provides standard data on all the luminaires.

(59) FLEXIBLE VALVES—24-p Catalog FL 382 describing the complete line of pinch-type non-plugging flexible valves manufactured by the Farris Flexible Valve Corp., Palisades Park, N. J., is available from that company. Detailed data include design features, sizes, specification, installation, and application recommendations for various mining uses.

(60) CHAINS — Campbell Chain Co., York, Pa., offers Catalog 53 showing specifications, sizes, grades and load limits on its various types of industrial and commercial chains. It also contains details about slings, hooks and repair links, plus the complete line of Campbell tire chains.

(61) DIESEL TRUCKS—Five Cummins diesels and 17 standard models of Euclid equipment they power are described in a 16-p booklet available from the Euclid Road Machinery Co., Cleveland 17, or the Cummins Engine Co., Inc., Columbus, Ind. Entitled "Cummins Powered Euclid Equipment," it covers Cummins diesels in Euclid equipment ranging from the 15-ton rear-dump to the 40-ton bottom-dump coal hauler.

(62) EARTHMOVERS—Three new specification booklets giving detailed information on the Gar Wood ¾-yd Model 75A and Model 75B excavators and the 75BT truck cranes are offered by Gar Wood Industries Inc., Wayne, Mich. Included are capacities, ranges, reaches and attachments available for all three.

(63) GEARMOTORS—The function, design and more than 200 applications of gearmotors are described in Bulletin GEA-1487H available from the General Electric Co., Schenectady 5, N. Y. Covering the standard types of G.E. Tri-Clad gearmotors with ratings from ¼ up to 200 hp, the 16-p booklet explains adaptability to low-speed jobs and adjustable-speed drives, describes gearmotor maintenance and details electric types and characteristics.

(64) ELECTRODES—50-p pocket guide to Airco electrodes covers characteristics and procedures for over 80 different electrodes, with sections on "Picking the Right Electrode," mechanical properties and testing, and AWS-ASTM specifications. Booklet ADC650 from Air Reduction Sales Co., New York 17.

(65) HYDRAULIC EQUIPMENT—Catalog M-5131 covering its complete line of oil hydraulic equipment for mobile applications is offered by Vickers, Inc., Detroit 32. It provides latest specifications and engineering information on Vickers hydraulic vane-type pumps and motors, valves, power-steering pumps and steering boosters, and other oil hydraulic units specifically designed for equipment in mining and other industries.

(66) SWITCH MATERIALS—Savings in time and money through single-source buying of track materials and supplies are pointed up in a new 44-p Catalog 575A issued by the L. B. Foster Co., P. O. Box 1647, Pittsburgh 30. Included is general information for ordering and installation of frogs, switches and stands and descriptions and specifications for the company's full line of switch materials and parts.

(67) PACKAGED POWER—Bulletin GEA-5928 on Inductrol Power Packs, for AC lighting and power service up to 112.5 kva, 500 v and below, is available from the General Electric Co., Schenectady 5, N. Y. It explains why voltage should be regulated and the advantages of using packaged equipment to provide this regulation, with data and prices on 3-phase Inductrol Power Packs.

(68) SCRAPER—Details of the new "lever action" Euclid 15.5-yd scraper, featuring vertically mounted jacks actuating levers which independently control the bowl, apron and ejector, are presented in a 16-p folder available from the Euclid Road Machinery Co., Cleveland 17. In addition to scraper design and operating features, the catalog explains the advantages of the traction, speed and stability achieved with the 275-hp Euclid 4-wheel tractor.

(69) ELECTRIC MOTORS—Louis Allis Co., Milwaukee 7, Wis., offers Bulletin 1300 on its line of wound-rotor motors, ½ to 1,000 hp. The bulletin covers wound-rotor principles of operation, contains performance curves and characteristics and outlines the construction, methods of manufacture and various enclosures available.

(70) COMMUNICATION SYSTEM—Farmers Engineering & Mfg. Co., Irwin, Pa., offers Bulletin 23 describing its new Femco Pagephone systems, which provide clear natural and distinct speech over standard telephone-type handsets, plus an unusual "all-hear" paging feature which utilizes a built-in loudspeaker system, using one central amplifier, one common cable and requiring no operator.

(71) TRACTOR—28-p Booklet TD-816 describes and pictures the LeTourneau Turnatractor, high-speed, electric control, rubber-tired tractor available with 10 interchangeable attachments. Available from LeTourneau-Westinghouse Corp., Peoria 8, Ill.

(72) MOTOR-GENERATORS—Bulletin 30-200 describes 23 designs of motor-generators from ¾ to 1,500 kw and gives electric specifications and application of each. Available from the Electric Products Co., Cleveland 12.

(73) RUBBER LINING of steel tanks, drums, pipes, valves, fittings and pumps is discussed in bulletin available from the Coatings Div., Metalweld, Inc., Philadelphia 29. Covered are details on the chemical-, abrasive- and temperature-resistant qualities of rubber linings, types and methods of application.

(74) AC WELDING—Three basic AC welding machines and their accessories are appraised in 17-p Booklet B-5622 available from the Westinghouse Electric Corp., Pittsburgh 30. Pointing to the great variety of AC welding applications, the booklet shows that when AC welders are substituted for DC welders savings are realized in production time, power, maintenance and depreciation.

(75) WIRE-ROPE SLINGS—Folder 5208 from Macwhyte Co., Kenosha, Wis., shows slings in three body types having

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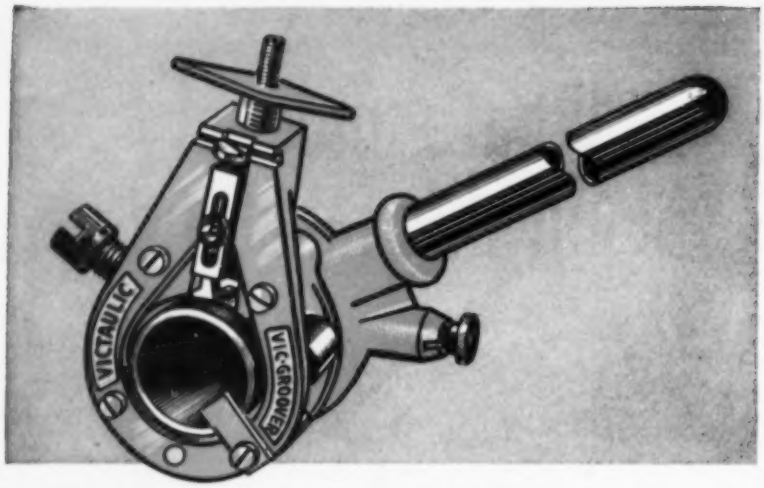

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approximate breaking strengths of 1,000 lb to 243.4 tons, with sizes, weights, safe loads and other sling data.

(76) LUBRICATING EQUIPMENT—Aro Equipment Corp., Bryan, Ohio, offers 68-p Catalog 19 covering its line of lubricating pumps, hand and power guns, hose, fittings and other accessories.

(77) PLUG VALVES—Bulletin V/4 from Duriron Co., Inc., Dayton 1, Ohio, provides operating and specification data on Durco Type F corrosion-resistant nonlubricated plug valves from ¼ to 1 in, designed for long maintenance-free service with no metal-to-metal contact, galling or sticking.

(78) PROTECTIVE SLEEVES for application on various types of machinery are shown in Bulletin BA-1 on Gortite neoprene-base sleeves available from A & A Mfg. Co., Milwaukee 3, Wis.

(79) INDUSTRIAL HEATERS—A 32-p Catalog 1510 from the Westinghouse Electric Corp., Hyde Park, Boston 36, Mass., gives the complete story on standard and heavy-duty centrifugal-fan industrial heaters. Information on where to use the heaters, at what circulating capacities and temperatures, and how to place them is given, along with full selection data.

(80) AIR TOOLS—72-p Catalog 60 available from the Aro Equipment Corp., Bryan, Ohio, provides operating, application and specification data on the Aro line of industrial air tools, such as grinders, sanders, drills, tappers and wire-brush tools and accessories.

(81) GEARS—Bulletin M-53 entitled "Cone-Drive Gears at Work in Mining" available from Cone-Drive Gears Div., Michigan Tool Co., Detroit, Mich., shows typical applications of Cone-Drive double-enveloping worm-gear sets and speed reducers in equipment such as continuous-mining machines, conveyors, rock-drilling machines and car spotters.

(82) TRUCK LOADERS—Bulletin L-6911 describing Galion Load-elevators, hydraulic end-loaders for loading and unloading trucks, is available from the Galion All-steel Body Co., Galion, Ohio.

(83) HARDFACING—Information on applying Colmonoy No. 6, a versatile all-purpose hardfacing alloy that may be applied by oxyacetylene or electric arc welding, hot formed as an overlay, applied in the form of castings, or sprayed on, is available in a Pamphlet 104 from Wall Colmonoy Corp., Detroit 3, Mich.

(84) COLD-FINISHED CARBON-STEEL BARS—"Guide to Selection, Use and Relative Cost" discusses the major characteristics and relative cost of a number of different analyses including Ledloy, said to be the fastest machining bar steel produced, and their suitability for carburizing or direct hardening. Available from Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80.

(85) JACKS—New 34-p General Catalog 53 on the Simplex line of mechanical and hydraulic jacks, hydraulic pullers, mine-roof and other special-purpose jacks is available from Templeton, Kenly & Co., Broadview, Ill. Included are application data, detail drawings, specifications and a full listing of accessories and attachments.

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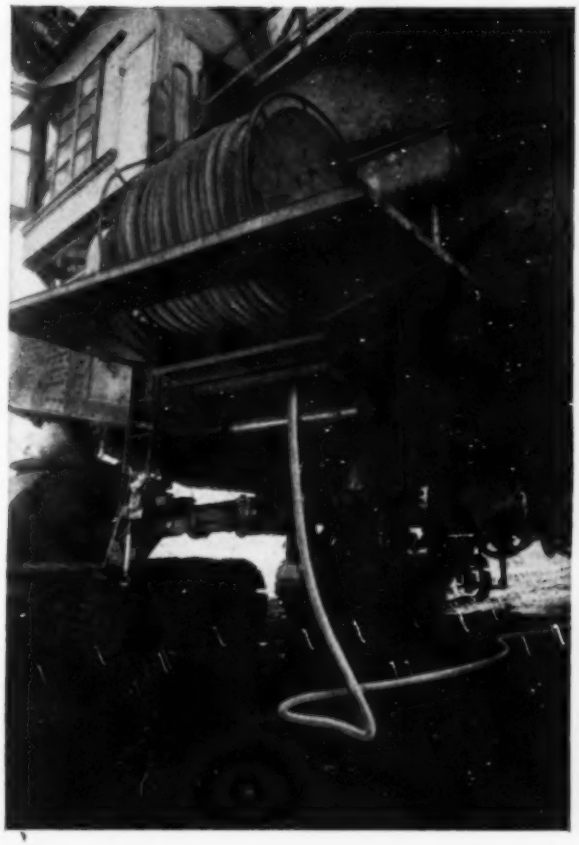

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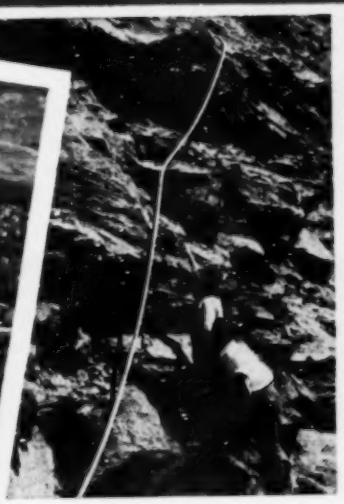

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News Round-Up

USBM Nominee Withdraws After Opposing Safety Law

TOM LYON, the Administration's nominee for director of the USBM, withdrew his name from consideration for the post June 24 after creating a political furore of some magnitude with his testimony the previous day before the Senate Interior Committee studying his nomination. In addition to telling the committee that he was drawing a revocable pension as a retired official of the Anaconda Copper Mining Co., he maintained that Congress was wrong in passing the Federal Coal Mine Safety Act of 1952 and that the bureau "should not be a policeman for the coal industry."

His testimony regarding his pension and the safety law apparently came as a complete surprise to the Administration, and there was considerable speculation in Washington as to how his nomination could have progressed to that point without his views being ascertained beforehand. Following the hearing, Sen. Arthur V. Watkins (R., Utah), Mr. Lyon's sponsor, said that in conscience he could not continue his support of Mr. Lyon and that he had asked him to withdraw. The second day's hearings, at which John L. Lewis, UMWA head, was scheduled to appear in person to underscore his opposition to Mr. Lyon, were cancelled and later in the day Mr. Lyon announced his decision to withdraw.

Long before President Eisenhower submitted Mr. Lyon's name to the Senate for confirmation on June 10, Mr. Lewis and other UMWA officials were reported to have protested the proposed appointment to both Douglas McKay, Secretary of the Interior, and the White House. Before the press May 18, Mr. Lewis called Mr. Lyon a "comparative ignoramus" not qualified to look after the safety of coal miners and termed the appointment "a political crime against the coal mining population."

In his statement announcing his withdrawal, Mr. Lyon said: "The principal bone of contention to my appointment seemed to be a pension I receive from the company I worked for for 34 yr. I feel that I earned that pension and I am sure the company feels the same way." Regarding the federal safety law, Mr. Lyon said: "This law is a phony and everyone connected with its administration including the UMW Union knows it is administratively impossible." Pointing out that there are some 9,000 coal mines and that many inspections a year are really necessary, Mr. Lyon also maintained that "to keep the inspection of coal mines up to date would require the services of several thousand inspectors and the staff of inspectors in the Bureau of Mines at present numbers 270 . . . I doubt very much that sufficient appropriations could be obtained to permit a director of the Bureau of Mines to do a real good safety job. This is why I believe the 'policing' section of the Federal Coal Mine Safety Act is administratively impossible."

Testifying before the committee, Mr. Lyon asserted that 99% of all mining accidents were the fault of "individual miners" and that mining companies took every precaution to prevent accidents "because they cost so much." He called the federal safety law "just that much more federal control" over the mining industry and said that the job was one for each state to handle.

Mr. Lyon caused a great deal of surprise among members of the Senate committee when he testified that he presently was receiving a pension of $5,000 a year as a retired official of the Anaconda Copper Mining Co. and that the pension could be cut off by the company at any time.

In the meantime, John J. Forbes, present Bureau director, indicated that he had not agreed at any time to take an inferior position in the Bureau and would not do so now after 38 yr with it.

381 Mines Found Free of Violations In First 9 Mo of Federal Inspection

In the first 9 mo to April 1, 1953, during which the Federal Coal Mine Safety Act has been in operation, 2,223 coal-mine inspections were made under Title II of the Act, applicable only to mines in which 15 or more persons are employed, according to reports. In the 2,223 inspections, 381 mines were found to be free of violations of the mine-safety provisions.

However, in the remaining 1,824 inspections, 5,814 alleged violations were reported. During this period, orders to withdraw men were issued to 33 mines. Of these, 27 received withdrawal orders because of failure to abate alleged violations of the mine-safety provisions, and seven because of alleged presence of imminent danger. Withdrawal orders, by states, were: Pennsylvania, 3; Ohio, 1; Virginia, 9; Tennessee, 1; Kentucky, 13; West Virginia, 3; Illinois, 2; Alaska, 1.

Frequently, more than one withdrawal order is issued at a mine at one time. At the 27 mines affected by alleged violations, 55 withdrawal orders were is-

Portal Prayer Precedes Shift

NIGHT-SHIFT MEN pause at the portal of the Elkhorn No. 3 mine of the Pond Creek Pocahontas Co. while Johnie Castle, cutting-machine operator, prays. A regular procedure when the night shift enters the mine, the prayer is Mr. Castle's idea and it receives the cooperation of both the men and management. A ski tow makes for easier walking up and down the slope.

sued. Eight withdrawal orders were issued at the seven mines cited for alleged presence of imminent danger.

Following is an analysis of the withdrawal orders issued under the Act, according to alleged violations of the mine-safety provisions:

Inadequate roof support on roadways	4
Inadequate quantity of air	5
Lack of fireboss in nongassy mines	4
Incomplete daily gas examinations	1
Dangerous coal-dust accumulations	15
No rock dusting	6
Incomplete rock dusting (certain areas not rockdusted)	3
Low incombustible content of dust	11
Non-maintenance of permissible units	1
Inadequate fire protection	4
Use of black blasting powder	1

The conditions which brought about the issuance of withdrawal orders because of the alleged presence of imminent danger were:

Imminent danger of inundations	2
Dangerous roof along roadways	3
Dangerous accumulations of gas	2
Gasoline from surface entering mine	1

1953 Keystone Coal Manual Now Available

Publication of the 1953 edition of *Keystone Coal Buyers' Manual*, a *Coal Age* affiliate, was announced last month by J. R. Forsythe, *Keystone* general manager.

Recognized throughout the industry as the "Coal Man's Bible" for its aid to coal buyers in evaluating operating companies and the coals they produce, *Keystone* is the only service of its kind published annually. Revised and brought up to date each year, *Keystone* provides coal buyers with detailed data on the Nation's coal companies and mines, such as size and location of mines, type of preparation and cleaning equipment used, actual sizes washed, number of employees, seam mined and thickness and type of opening.

It also contains detailed data on sales organizations, including sales offices and executives, a complete list of coals handled on an exclusive basis and a list of Trade Names.

Another feature of *Keystone* is the "Description of Seams" covering all seams commercially mined, with characteristics of each and average or range analyses. An index of companies by seams mined helps the buyer to readily compare all operations on any given seam.

Copies can be secured from *Keystone Coal Buyers' Manual*, 330 W. 42d St., New York 36, N. Y.

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Anthracite Group Cites Important Non-Fuel Use

An important new non-fuel use for anthracite was revealed in an announcement by Anthracite Equipment Corp. that around July 1 it would begin production of AnthraAid, a carbonaceous filter aid said to have many distinct advantages over other commercial filter aids.

AnthraAid is a talcum-like substance made from anthracite and will be used by industries engaged in the processing of chemicals, petroleum, food, beer, pharmaceutical products or in any operation in which suspended solids must be removed from liquids. For some years the corporation has been producing and marketing Anthrafilt, a filter medium now widely used in municipal and in-

ARTISTS UNDERGROUND at Lehigh Navigation's Coaldale mine sketch "Testing for Gas," as posed by Paul Dirnberger, company mine inspector. Officials participating in the tour of 167 members of the Lehigh Art Alliance were: Garrett B. Conover (right photo), Alliance president; Evan Evans, president, and Glenn O. Kidd, vice president, Lehigh Navigation; Quentin H. Smith, Jr., Alliance director of development.

Artists Paint "Anthracite Portrait"

Despite the heavy weather, 167 members of the Lehigh Art Alliance from 32 towns in the Lehigh Valley explored the properties of the Lehigh Navigation Coal Co. June 13 to paint and sketch a "Portrait of Anthracite."

As a result of the visit to the company's operations, selected as the "sitter" for this year's effort in the "Art in Industry" series, some 500 paintings, drawings, sculptures and ceramic creations are expected to be entered in an exhibition scheduled for October. Previous Alliance "portraits" have covered the electric, newspaper and dairy industries.

While some of the artists confined their work to the company's breaker, strip mine and power plant, most of them, in groups of nine accompanied by a mine inspector, descended to the 1,029-ft level of the Coaldale No. 8 mine to get a firsthand impression of underground work. Although it was a Saturday, sufficient employees were on hand to show the artists how mining is conducted, the breaker was placed in full operation for a short period, and strip mining was demonstrated. The group was welcomed by Evan Evans, Lehigh Navigation president, and Glenn O. Kidd, vice president, who pointed to the project as "a significant public relations event for the industry."

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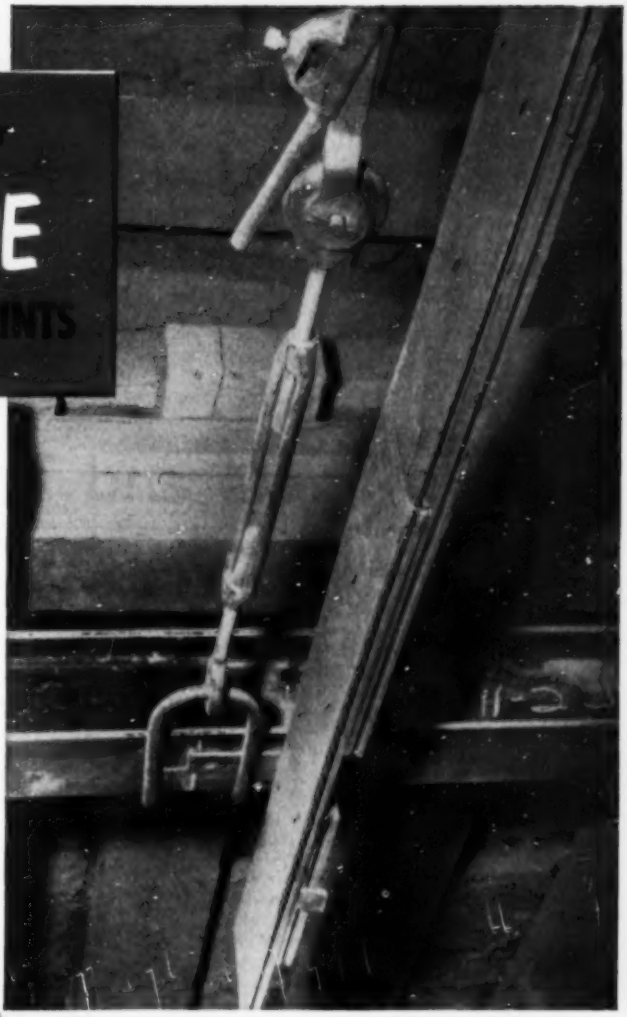

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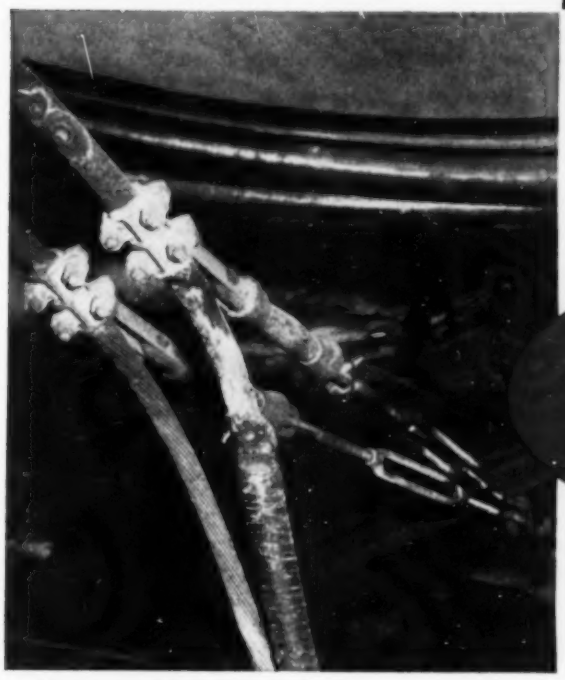
Wire Grips take sizes from 1/0 Round to No. 9 Section; Cable Clamps cover the range from 1/0 to 1,500,000 CM. Insulators range in electrical strength from 7 to 35 kilovolts; in mechanical strength, from 3000 pounds to 20,000 pounds. See your No. 27 catalog for complete information on dead-ending and strain-holding materials. It shows a *complete* line.



O-B Insulated Turnbuckle and O-B Dead-End Cam Grip hold end of Trolley Wire.

O-B Mechanical Feeder Wire Strain Clamps, O-B Wood Strain Insulators, and O-B Turnbuckles hold feeder cables at strain point.

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dustrial water-filtration plants, also made of anthracite. Further research on the use of anthracite for filter purposes resulted in the development of AnthraAid.

"AnthraAid has already been used by many of the largest chemical and food companies in plant scale tests and the results have been so highly favorable that the corporation decided to enter production on a large scale," reported Frank W. Earnest, Jr., President of the Anthracite Equipment Corp., and of its parent organization, the Anthracite Institute. The necessary equipment has been ordered and is being installed in a building leased from the Jeddo-Highland Coal Co. in Jeddo, Pa.

"We believe we are just scratching the surface," Mr. Earnest said, "in finding non-fuel uses for anthracite. It is our hope that by continuing research other uses for anthracite in commercial and industrial manufacturing will be found. In line with the policy of the board of directors of Anthracite Institute, certain new non-fuel products, such as AnthraAid, will be produced and marketed by the Anthracite Equipment Corp. Then as wider consumer acceptance is developed, it is hoped that tonnages will reach proportions where several producing companies will enter the field."

Anthracite Institute, which has served the anthracite industry for 25 yr, organized the Anthracite Equipment Corp., a wholly owned subsidiary, for the production and sale of anthracite products in the non-fuel category. The net income will be used to support a program of further research.

News Briefs and Trends

Federal Board Modifies USBM Mine-Closing Order

The Federal Coal Mine Safety Board of Review June 18 modified an order issued by a USBM mine inspector requiring the Snow Hill Coal Corp., Terre Haute, Ind., to close a section of its Talleydale mine for an alleged violation of the Federal Coal Mine Safety Act. The order was issued by Inspector Frank Perz under a provision of the law that in all underground face workings in a gassy mine where electrically driven equipment is operated, the examination for methane gas shall be made with a permissible flame safety lamp by a person trained in the use of such a lamp before such equipment is taken into or operated in face regions, and that frequent examinations for methane be made during such operations. Following a request from the company for temporary relief until a hearing could be held, the Board issued an order June 8 suspending the effect of the closing order until June 20. In its order issued after the hearing, the Board held that the time granted by the USBM to abate the alleged violation was unreasonable and gave the company until July 11 to train sufficient employees so as to comply with the federal statute and correct the situation that caused issuance of the closing order.

Supreme Court to Review W. Va. Ban on Mine Diesel

The U. S. Supreme Court has agreed to review the ruling of the W. Va. State Department of Mines prohibiting the use of diesel locomotives in underground coal mines, it was reported last month. The department's ruling, based on an opinion of the state Attorney-General covering applicability of the state law, was first upheld by the Kanahwa County Circuit Court and then by the West Virginia Supreme Court, which ruled March 3 that the law as written by the legislature clearly prohibits operation of diesels underground and maintained that the law must be rewritten before they would be legal (*Coal Age*, April, p 133). The diesel locomotive which brought up the question was built 2 yr ago by the National Mine Service Co. and purchased by Pond Creek Pocahontas Co. Although it and a later version have both been approved as permissible by the USBM, their operation underground has been strongly opposed by the UMWA.

And For Your Information . . .

The House Ways and Means Committee was expected to hold executive sessions during the week of June 22 for careful consideration of H. R. 5496, an outgrowth of the original Simpson bill calling for a 5% limitation on the import of residual fuel oil. Coal industry officials were being urged by the NCA and other organizations to emphasize their support of the measure to their own Congressmen and members of the committee.

John L. Lewis and Bernard Baruch were among the 14 guests at a "purely social" dinner party given by President Eisenhower in the White House June 22. The affair was described as the second in a series of "private dinner parties" and reporters were not permitted to talk to the guests.

The TVA has reported that it has contracted for almost 47 million tons of coal for its various steam plants, at a cost of over $200 million.

The Kentucky Reclamation Association this spring seeded or planted saplings on over 1,000 acres of land in Western Kentucky. The area represents about 200 acres more than was strip-mined during 1952, it said.

Workmen's compensation insurance rates on underground coal mines have been increased by the Virginia State Corporation Commission, effective July 1. At the same time, it approved a reduction in occupational disease rates for surface mines and a new rate-base plan separating large and small mines on a payroll basis.

Fire swept through the tipple of the Jacob's Fork Pocahontas Coal Co., at Squire, W. Va., June 2, causing damage estimated at $300,000. Operations of the mine, which produces some 200,000 tons annually, would be halted for about 6 mo until a new tipple could be built, company officials said. Cause of the blaze was not immediately determined.

The 4-day trial of Allan Condra, UMWA official charged with "aiding, counseling and procuring" the dynamiting of a Wise County (Virginia) coal mine, ended in a jury deadlock May 25. The case was continued to the July term of the Wise County Court for retrial. In Clay County, West Virginia, three men were indicted June 3 for the murder May 7 of a non-striking miner employed by the Elk River Coal & Lumber Co., Widen, W. Va. The other 45 men arrested in connection with the fatal shooting were released by the grand jury's action.

The United States Fuel Co. is offering another 4-yr scholarship in coal mine engineering at the University of Utah. It becomes effective this fall and provides $500 annually. Two scholarship holders are presently attending the university under awards made by the company in previous years.

MEETINGS

Open-Pit Mining Association: Annual meeting, July 17, Rose Polytechnic Institute, Terre Haute, Ind.

Jamison and R&P Teams Top Pennsylvania Safety Meets

The team of the Jamison 21 mine, Jamison Coal & Coke Co., Hostetter, Pa., was the winner of the 6th Annual First Aid Contest of the Westmoreland County Safety Association held at St. Vincent College Stadium, Latrobe, Pa., June 13. Led by Capt. Clair Taylor, the team received the top prize of $200 and the MSA plaque when they bested the other 10 teams with a score of 99.533%. Placing second was the Carpentertown Coal & Coke Co. team, captained by Louis Sibol, which received $160 and the NCA plaque, with a score of 99.267. The Delmont Fuel Co. team, headed by Don Fogley, took the third place prize of $120 and the UMW Trophy, and fourth-place winner was the team of Stewart Coal & Coke Co. The prize-winning teams also earned the right to represent the district at the state-wide bituminous meet to be held in September.

In the 7th Annual First Aid Meet sponsored by the Moshannon-North Central Safety Association, held June 20 at Sykesville, Pa., the Helvetia mine team of the Rochester & Pittsburgh Coal Co., captained by Stanley Godak, placed first in a field of seven teams with a score of 99.867%, receiving a cash prize of $210 and the MSA Plaque. Second in the contest was the team of the Cambria No. 1 mine of the Imperial Coal Corp., James Greenawalt, captain, which received a cash prize of $175 for its score of 99.600%. Winner of the third-place cash prize of $105 was the Kramer mine team of the Northwestern Mining & Exchange Co., headed by Stanley Verona, with a score of 99.467%. The Boy Scout competition was won by the Madera Troop No. 58.

GUARDIAN GENIE of Mining Cable

Illustrated above is a typical rejacketing job on a cable splice made with a JOY Vulcanizer and a type "A" Mold.

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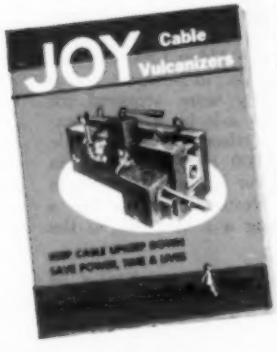
YOURS FOR THE ASKING . . . A copy of this attractive 16-page bulletin covering JOY Steam and Direct Heat-type Vulcanizers, Molds and Supplies has been reserved for you. *Write for it now.*



If there is a kindly spirit that looks out for mining equipment, JOY Cable Vulcanizers certainly rate among its best tools. Every year since their introduction in 1928, they've been more widely used for cable conservation. Today, with replacement cable often difficult to obtain—and with proper on-the-job repairs therefore multiplied in importance—JOY Vulcanizers really are the *guardian* of portable power lines.

Why take chances with cold-taped splices when *permanent* repairs can be made so easily and economically with JOY's proved method of cable maintenance? ● You'll want to know how our JOY Vulcanizers are being used to help maintain high mining production schedules in spite of cable shortages. *Ask for a full description of the many advantages of hot vulcanization today!* ● **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.,** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

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JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

New Mine Developments

Over $77 Million in Coal Construction Certified Under Defense Program

Rapid tax amortization under the defense mobilization program has been certified for 50 coal projects costing more than $77 million and providing some 13½ million tons of capacity, Secretary of the Interior McKay recently reported. Most of the new capacity is for metallurgical coal to meet the expanded needs created by extensive coke-oven and blast-furnace construction. Up to April 30, 87 coke-oven construction projects costing some $636 million and providing almost 17 million tons in added coke capacity also were certified for tax amortization, it was said.

During the period from Feb. 15 to April 30, 1953, five bituminous coal projects received accelerated tax amortization, as follows: Hellier Coal & Coke Co. (two projects), Pike County, Kentucky; Delmont Fuel Co., Westmoreland County; Hamar Coal Co., Allegheny County; and Eastern Gas & Fuel Associates, Cambria County, Pennsylvania. In that period, a $10,000,000 coke-oven project of the Youngstown Sheet & Tube Co. also was certified.

Earlier, the ODM announced that metallurgical-coal and coke capacity goals had been increased by 2.5 and 1.8 million tons, respectively. The new capacity goals, made necessary after the expansion program for blast-furnace production was boosted by 2 million tons, are: metallurgical coal, 139.7 millions tons, of which 137,250,000 tons was to be reached by June 30 of this year; and metallurgical coke, 85.8 million tons by Jan. 1, 1955.

New JC&C Plant Expected to Broaden Metallurgical Markets

Completion of a new air-cleaning plant at the Beaverdale (Pa.) mine of the Johnstown Coal & Coke Co., which is expected to produce a uniformly clean product capable of meeting the most rigid specifications of metallurgical users and result in an expansion of markets, was reported last month. Designed and erected by Roberts & Schaefer Co. in conjunction with the company's staff, the new plant utilizes two 6 x 12-ft R&S Super-Airflow air tables for cleaning the ⅜ x 0 slack before it is loaded into railroad cars. The Beaverdale operations are conducted in the Lower Kittanning and Lower Freeport seams, producing high-grade low-volatile coals that qualify as excellent metallurgical coals because of low sulphur and ash contents, company officials point out.

Poplar Ridge's New Barges To Increase Coal Tonnages

The Poplar Ridge Coal Co., a subsidiary of the Union Electric Co., St. Louis, will introduce in river coal towing this fall four new "box-type" barges to increase coal tonnages carried on the 290-mi haul between its mine at Caseyville, Ky., and Union Electric's power plants in St. Louis. Under construction by the Dravo Corp., the 195 x 35-ft barges are square-ended vessels designed to carry additional coal tonnages and intended for use with 12 semi-integrated barges built by Dravo for the company last year. Placing one box-type barge between two semi-integrated barges permits an unbroken hull line of 585 ft.

VPI Students Receive Operators' Scholarships

SCHOLARSHIPS provided by the Virginia Coal Operators' Association were awarded five students in mining engineering at Virginia Polytechnic Institute during the past academic year. Recipients, shown here with Prof. Charles T. Holland, head of the mining department, are: front—Herbert L. Schaaf, Hopewell; and Ellis Paxton Bucklen, Raven; rear row—Strother M. Newman (left), Falmouth; Don C. Cassel, Norton; and James E. Reach, Big Stone Gap. Messrs. Cassell and Schaaf were graduated with BS degrees in mining engineering last month. Another scholarship will be granted by the Virginia Coal Operators' Association for the coming college year.

And For Your Information . . .

The Weirton Steel Co. Div. of the National Steel Corp. announced early last month that on June 27 it would close its new Weirton mine, near Morgantown, W. Va., for an indefinite period because of difficult operating conditions. Specific reasons for the closing were not disclosed, but reports indicated that geological conditions within the mine were an important factor. Opened to supply the company's steel plant in Weirton, W. Va., the mine has been under development to a capacity of 4,200 tpd.

The Barnes & Tucker Co., Barnesboro,, Pa., has purchased the Renglo mine of the Rochester & Pittsburgh Coal Co., Twin Rocks, Pa. The property, operated by R&P since 1946, was closed down last November.

In Alaska, the Usibelli Coal Mines, Inc., of Suntrana, presently engaged in strip mining, reportedly has obtained a $485,000 loan from the RFC to increase output by underground methods.

Stock of the St. Louis & O'Fallon Coal Co., which operates the Black Eagle No. 2 mine, at Belleville, Ill., has been acquired by a new company, the Wilma Coal Co., Inc., Belleville. Owners of the new company are reported to include Kenneth E. Woosley, president of the Woosley Salvage & Equipment Co., Belleville; John A. Becker, a retail coal and ice dealer of Collinsville; and A. L. Meyer, assistant secretary-treasurer of St. Louis & O'Fallon Coal. Present plans call for continued operation of the mine, which employs some 200 men, it was said.

The Breyer Coal Mining Co., New Philadelphia, Ohio, has been acquired by the Penn-Ohio Coal Co., a newly organized Ohio corporation headed by Joseph C. Johnson, Avella, Pa. The new company plans to almost double the present output of 800 tpd. Involved in the sale were a coal tipple, two strippings, land and leases on 1,500 acres of coal.

The U. S. Steel Corp. was scheduled to permanently close its National No. 1 mine, at Morgan, Pa., June 26 because of the exhaustion of the coal. In operation over 50 yr, the mine recently has been employing 220 men and producing some 900 tons of steam coal daily. The men are being given an opportunity to apply for employment at other U. S. Steel operations.

Properties of the Alden Coal Co. and the Alden Realty Co., in Newport Township, Pa., recently were acquired for costs at a sheriff's sale by a representative of Weston Dodson & Co. The sale followed a $75,000 court judgment in favor of the Silver Brook Coal Co., as successors to Weston Dodson, for a mortgage securing a loan made to the companies.

whys ?

It's wise to know why one line of lubricants will outperform another. Mining men throughout the country have asked and found out why the complete line of Cities Service Lubricants is the wisest choice in terms of dollars and output. Why not talk to one of our Cities Service Lubrication Engineers yourself? Or write Cities Service Oil Company, Dept. G5, Sixty Wall Tower, New York City 5, New York.

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Mine Inspectors Probe Safety

In 43rd annual convention, Mine Inspectors' Institute of America seeks more safety for men and equipment; stresses training for supervisors and workers; aims at cutting toll among foremen and officials.

BELT-CONVEYOR FIRES, roof-bolt inspection methods, safe shuttle-car operation, state mining laws, safety for supervisors, underground training in safety, continuous mining, and electric-utility plans for using coal were top subjects as 200 mining men gathered at Birmingham, Ala., for the 43d annual convention of the Mine Inspectors' Institute of America, June 8-9.

Institute members selected Pittsburgh, Pa., as their 1954 convention city and, in the closing session Tuesday afternoon, elected new officers as follows: *president*, George H. Deike, Mine Safety Appliances Co., Pittsburgh, Pa.; *vice presidents*, Kenneth C. Lee, Wilkes-Barre, Pa.; Joseph Bierer, Department of Mines, Charleston, W. Va.; and T. J. Casey, Halifax, Nova Scotia; *secretary*, C. A. McDowell, Jones & Laughlin Steel Corp., California, Pa.; *assistant secretary*, Robert Bradford, Oklahoma City, Okla.; *treasurer*, Frank T. Powers, Department of Mines, Westernport, Md.; *editor-in-chief*, J. H. Edwards, *Coal Age*, Huntington, W. Va.; and *publicity editor*, W. K. Kollak, Albany, N. Y.

"Any step that tends to reduce a coal miner's burden should be encouraged without question."

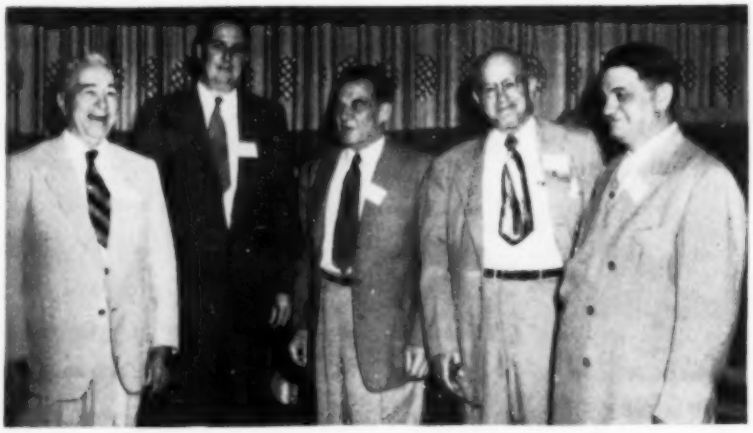
Paying tribute to state mine inspectors in Alabama and elsewhere and to men of the U. S. Bureau of Mines, Milton H. Fies, vice president, Alabama Power Co., cited advances in the cause of safety, such as roof-bolting, and pointed to the need for clearer definition of terms, such as "excessive" and "dangerous" dust. Mr. Fies was the speaker at the Monday morning session at which J. G. Hanlin, chief of safety and inspection, Alabama Department of Industrial Relations, and John M. Malloy, Oklahoma's chief mine inspector, presided jointly.

Mr. Fies, giving an account of research sponsored by his company, told of efforts to find out whether vitrain in coal really is an inhibitor of pneumoconiosis, as has been suggested in studies in Great Britain. Then, turning to the main burden of his address, he outlined the expansion plans of his company and the role of coal in those plans.

Coal, Mr. Fies pointed out, is the one dependable mineral fuel to which the electric utilities can turn for the future. With 1952 power production by The Southern Co., including Alabama Power Co., Georgia Power Co., Gulf Power Co. and Mississippi Power Co., running 8½% above 1951, capacity of the system by 1955 will be nearly 3,600,000 kw, nearly four times as great as in 1940. Most of this capacity will be steam-generated, with fuel to be provided by mines in Tennessee, Alabama and west Kentucky. By and large, power plants will be located at the mines and high-tension transmission lines will carry power to distant customers. With The Southern Co.'s coal needs estimated at 8,000,000 to 10,000,000 tons per year by 1960, the organization is encouraging the following developments, Mr. Fies stated:

1. Wider use of continuous miners, which in some instances have doubled productivity since 1950.
2. Reducing transportation costs, notably in one instance by a combination of river and truck movement.
3. Gasifying coal underground, with the possibility of bringing producer-gas costs down to 12c per million Btu.
4. Low-temperature carbonization of coal in a fluidized bed, with chemicals

NEW OFFICERS—George H. Deike (left), Mine Safety Appliances Co., president; Joseph Bierer, West Virginia Department of Mines, vice president; C. A. McDowell, Jones & Laughlin Steel Corp., secretary; Robert Bradford, Oklahoma Department of Mines, assistant secretary; Frank T. Powers, Maryland Bureau of Mines, treasurer; Frank Hillman (front), Birmingham, who installed officers; and W. K. Kollak, New York Dept. of Labor, publicity editor.



CONTINUOUS MINING, BELT FIRES AND MINE INSPECTORS—Ralph Beerbower (left), Goodman Mfg. Co. (retired), session chairman; John H. Hansford, Carbide & Carbon Chemicals Co.; H. P. Farley, West Virginia Department of Mines; A. D. Sisk, Kentucky Department of Mines & Minerals; and J. A. Boyle, Coal Div., U. S. Steel Corp.

and power-plant char the major products.

5. Recovery and use of Alabama lignite, along lines already laid down by Texas Power & Light Co.

"The need for revising some state mining laws has been apparent for several years."

Amendments made to Kentucky mining laws in 1952, the first revision in some 30 yr, were summarized by William H. Roll, Kentucky Department of Mines & Minerals, at the Monday afternoon session, at which Mr. Deike presided.

Major amendments discussed by Mr. Roll were as follows: (1) clarification of the term "gassy" as applied to coal mines; (2) extension of the state's inspection authority to include strip mines; (3) provision for four annual inspections of each operating mine; (4) clarification and tightening of the qualifications for certification of mine officials; (5) licensing of mines, with requirement that a mine map be filed annually; (6) new ventilation requirements; (7) strict regulations for installation of belt conveyors; (8) authorization for the use of diesel-powered machinery underground; (9) tighter regulations on transportation; (10) addition of 29 new paragraphs on electricity in mines; (11) new sections on explosives and blasting practices; and (12) provision for boreholes in advance of the face when approaching abandoned workings.

INDUSTRY MEETING — A Special COAL AGE Staff-Written Report

MINING LAWS AND ROOF-BOLTING—W. H. Roll (left), Kentucky Department of Mines & Minerals; H. J. Dusz, Ohio Division of Mines; M. C. McCall, Region VII, U. S. Bureau of Mines; L. R. Johnson, Peabody Coal Co.; Edward A. Morgan, Region IV, U. S. Bureau of Mines; Joseph S. Mathews, Compass Coal Co.; and George H. Deike, Mine Safety Appliances Co., newly elected institute president, who served as session chairman.

TRAINING, SUPERVISORS' SAFETY AND SHUTTLE CARS—John M. Malloy (left), Oklahoma Department of Mines, session chairman; W. Dan Walker, District VIII, U. S. Bureau of Mines; Joseph Bierer, West Virginia Department of Mines; J. V. McKenna, Pennsylvania Department of Mines; and I. C. Spotte, Princess Elkhorn Coal Co.

After 15 mo of experience with the new laws, Mr. Roll reported that they have resulted in closer coordination between deep and strip mining, more safety in the use of explosives and electricity, better-qualified foremen, more information about small mines hitherto unknown to the state authorities, reduction in the incidence of belt-conveyor and electrical fires, and a stricter enforcement of safety regulations.

In Ohio, amendments made in 1949 to state mining laws supplemented revisions made in 1941, said H. J. Dusz, chief, Ohio Division of Mines. He explained that the changes made in 1949 provided for control of dust by water or other effective methods, rock-dusting in nongassy as well as gassy mines, redefinition of gassy mines, removal of men when there is danger of explosion, drilling of advance boreholes when approaching old workings, and sealing the shafts of abandoned mines.

Discussion of papers by Mr. Roll and Mr. Dusz, led by Richard Maize, formerly Pennsylvania's Secretary of Mines, brought out the fact that in Kentucky and Ohio there is no way of declaring a mine "non-gassy" once it has been declared "gassy," even though gas may never again be found in the mine. In Pennsylvania, Mr. Maize reported, the term "gassy" may be removed if no gas is found within 4 yr. James Westfield, chief, Health & Safety Branch, U. S. Bureau of Mines, pointed out that whereas Ohio law requires that at least two samples of air show dangerous accumulations of gas before a mine may be declared "gassy," federal law provides for only one sample. Suggesting that the federal law be changed to require two samples, Mr. Westfield pointed out that the change would give mine operators a better break and would result in more uniformity in the classification of mines.

"Roof-bolting not only prevents accidents but increases productive efficiency."

Summarizing experience in investigating some 500 failures of roof where roof-bolting was used either directly or remotely, H. C. Young, roof-control representative, USBM, Birmingham, offered some guides for men who install or inspect roof bolts. Mr. Young's paper was red by M. C. McCall, Accident Prevention & Health Division, USBM, Birmingham.

Ninety per cent of the roof falls investigated are attributed to failure to install enough bolts or failure to install them in such a way as to consolidate the resultant beam, Mr. Young explained. Any installation of roof bolts must be based on a careful study of conditions, bearing in mind the fact that the span that can be bridged is directly a function of the length of the bolts used and the penetration obtained.

Inspectors should carefully check the following, Mr. Young said: (1) conformance with the bolting plan evolved for the mine, with attention to average centers, width of openings, use of extra

(*Continued on p. 178*)

Personal Notes

Dawson Collieries, Inc., Dawson Springs, Ky., recently announced changes and promotions among its executive personnel. Company officials now include **J. H. Schneider,** chairman of the board; **W. A. Borries,** president; **V. C. Roerk,** vice president; **P. W. Lynch,** secretary-treasurer; and **W. A. Morris,** sales manager. All five were re-elected members of the board of directors for the company.

Dr. Henry H. Storch last month was named chief of the Synthetic Liquid Fuels Branch of the U. S. Bureau of Mines, Washington, D. C. Dr. Storch has been with the Bureau since 1928 and during most of his service has directed research on gas reactions and the chemistry of coal hydrogenation. For the past 2 yr he has been chief of the Fuels Technology Div. of the Bureau's Region VII at Pittsburgh, and for 7 yr previous to that was chief of the Research and Development Branch of the Bureau's former Office of Synthetic Liquid Fuels at Pittsburgh and Bruceton, Pa.

K. C. Adams, editor of the UMW *Journal* retired from that post July 1. Mr. Adams had served the UMWA for some 40 yr and is widely known for his writings in the *Journal.*

Glynn L. Coryell, formerly with the U. S. Machine Corp. as district sales manager, has been appointed to the staff in the Engineering Dept. of the National Coal Association. A graduate of the University of Kentucky in 1931, he served for several years in the University's fuel testing laboratory before joining E. P. Murphy & Son Coal Co. as manager of the stoker department. Prior to joining U. S. Machine Corp. in 1938, Mr. Coryell was national service manager and chief development engineer for Holcomb & Hoke Mfg. Co.

C. Leslie Bailey, assistant mine foreman, TrauxTraer Coal Co., Kayford, W. Va., and **Richard E. Barr,** section foreman, Shannopin mine, Jones & Laughlin Steel Corp., Bobtown, Pa., have been appointed federal coal mine inspectors. Mr. Bailey will operate from the Norton, Va. office of the Bureau of Mines, and Mr. Barr will work from the St. Clairsville, Ohio office.

Jack A. Simon, associate geologist, Illinois State Geological Survey, has been named geologist and head of the coal division, succeeding Dr. Gilbert H. Cady who retired Aug. 1, 1952. A graduate of the University of Illinois and Northwestern University, Mr. Simon has been associated with the Illinois State Geological Survey since 1937.

J. B. Dollar, assistant foreman, Gorgas mines, Alabama Power Co., Gorgas, Ala., has been named foreman. Prior to joining the company in 1952, he was associated with Republic Steel Corp. for 9 yr.

Walter F. Owens has been appointed chief electrician at the Beards Fork mine, Coal Div., EG&FA, replacing **Ralph Holmes,** resigned. **Benjamin F. Williams,** formerly at Eccles, is now a section foreman at Beards Fork, and **Emery Griffith** has been promoted to section foreman.

Obituaries

Harvey Cartwright, 64, secretary-treasurer of the Indiana Coal Operators' Association, died June 4 at his home in Terre Haute, Ind., after a prolonged illness. Widely known throughout the industry, Mr. Cartwright had been an official of the Indiana association since 1928 and had long been active in labor negotiations, serving for some years as a member of the National Bituminous Wage Negotiation Conferences as well as in regional negotiations. Mr. Cartwright entered the mines at the age of 14 and before joining the Indiana association was president of District 11 of the UMWA.

Herman W. Tolley, 46, foreman, New River & Pocahontas Consolidated Coal Co., Havaco, W. Va., died June 3 in a Welch, W. Va., hospital.

Association Activities

MEMA Names Head

Fred J. Bucher, electrical engineer, Hillman Coal & Coke Co., Pittsburgh, has been named president of the Mining Electro-Mechanical Association Central Advisory Council. William Wood, electrical superintendent, Berwind-White Coal Mining Co., Windber, Pa., was elected vice president.

Williamson Officers Elected

The Operators Association of Williamson Field, Williamson, W. Va., has elected J. D. McLaughlin, president, New Alma Coal Co., to the presidency, succeeding J. M. Tulley, president, Crystal Block Coal & Coke Co., who resigned. Also elected vice president was C. W. French, president, Peter White Coal Co. and Home Creek Smokeless Coal Co., to fill the unexpired term of the late Harry S. Gay.

Amherst Coal Operation In 50 Top Mines of 1952

In recent correspondence, H. D. Moore, superintendent of personnel, Amherst Coal Co., advises that the company's Nos. 1 and 4 mines are operated as one property and consequently should have been included in "The 50 Biggest Mines of 1952" (*Coal Age*, May, p 105). Located at Amherstdale, Logan County, W. Va., the operation produced 1,222,018 tons of bituminous coal in 1952, thus ranking 27th among the Nation's leading mines.

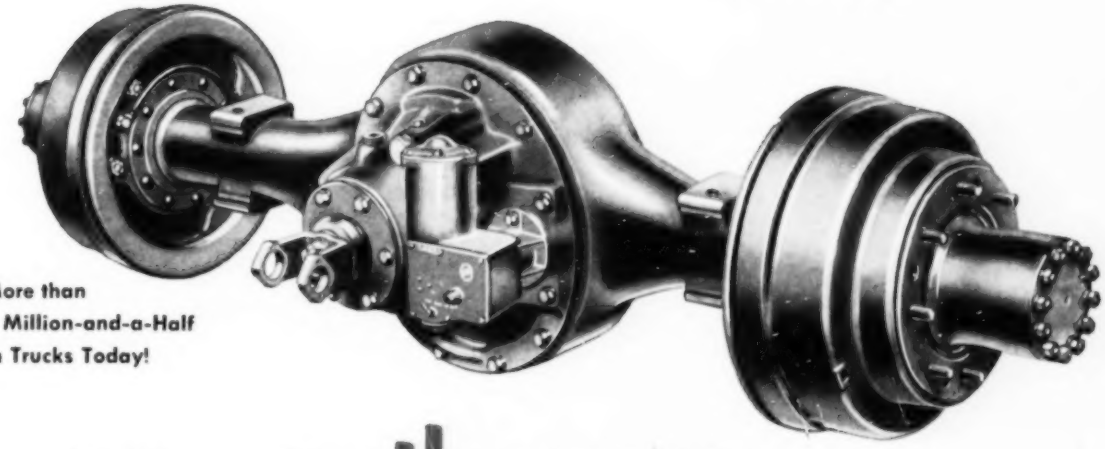
Connor Retires From DSFA

CHARLES W. CONNOR, Defense Solids Fuel Administrator since December, 1950, recently submitted his resignation, effective June 30. Mr. Connor planned to return to his home in Charleston, W. Va., and permanently retire from active business, it was reported. Mr. Connor had previously retired as manager of the mining division of the Armco Steel Corp. and was serving as a consulting engineer when he was named to the DSFA. At the 11th Honor Awards Convocation of the Department of the Interior in Washington May 26, Mr. Connor was one of those receiving the Distinguished Service Honor Award, the highest honor conferred by the department. Others similarly honored included Thomas Fraser, Harold P. Greenwald, and Harry F. Yancey, all with the USBM.

New Safety Group Formed

Eastern Gas & Fuel Associates, Keystone mine employees numbering 1,135, have formed the first chapter of the Holmes Safety Association in McDowell County, W. Va. The new officers elected were: Evord Connor, president; R. Keesee, vice president; Lowell Shrewsbury, secretary-treasurer; Paul Slvey, safety director; Mr. Cyphers, educational director; Walter Laxton, social director; Dr. H. Evans, health director; Robert Ross, R. B. Pickett, Odell Haynes, George Harris and Reginald Minnis, executive committee members. Later, employees of the Superior mine, Lake Superior Coal Co., formed the second chapter in McDowell County. Officers elected were: David White, president; James Collins, vice president; Clarence Caudle, secretary-treasurer; Herbert Smith, safety director; E. N. Reed, social director; Dr.

On the Job or on the Trade Eaton 2-Speed Axle Trucks



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Eaton 2-Speeds double the conventional number of gear ratios. Trucks make more and quicker trips, with full payload, over all kinds of roads, in all types of service, at lower operating cost, with minimum upkeep. Engines operate within their best speed range; stress and wear are held to a minimum. Eaton 2-Speed Axle trucks last longer, earn more, and are worth more on the trade-in. Ask your dealer to explain.

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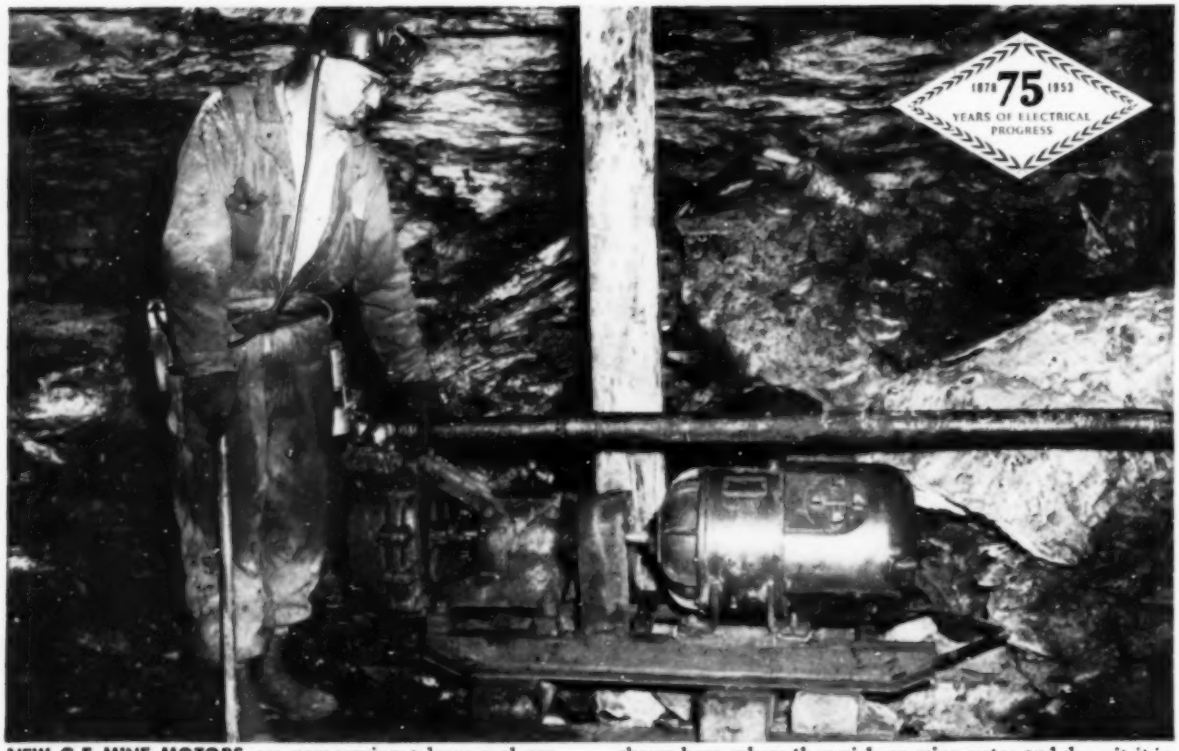

NEW G-E MINE MOTORS are now serving a large coal producing company in the Pocahontas coal fields. Ten are used to drive gathering pumps close to the working face, as shown here, where they pick up mine water and deposit it in a large sump. G-E mine motors resist corrosive mine water and coal dust, last longer in mining service.

New motor easily maintained in mine

TWO-STUD BRUSH CONSTRUCTION permits locating all brushes on one half of commutator—makes them easy to reach through two large hand holes instead of four.

G-E mine motor permits checking brushes, changing cable, without dismantling motor

You'll find all the features wanted most by mining men in General Electric's new totally enclosed d-c mine motor:

Easier to maintain No need to take motor apart or off your machine. Two-stud construction makes all brushes easier to reach. Removable cable gland permits easy cable replacement if necessary.

Longer-lasting Corrosive mine water and coal dust won't harm it, thanks to cast-iron end shields and heavy rolled-steel magnet frame.

Easier to install Fits in minimum mining-machine space because no part extends beyond this compact motor's normal width.

Whether you buy or build mining machines, learn more about this new G-E motor. Ask your G-E Apparatus Sales representative, or write for Bulletin GEA-5553 to General Electric Co., Sect. 663-34, Schenectady, N.Y.

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That's why mining men look to J&L for wire rope that fits their equipment requirements . . . has the strength, flexibility and toughness to stay on the job and help hold down operating costs. The results of J&L Wire Rope service life are reflected on the profit sheet in terms of minimum downtime for re-rigging, high production and an increase in tons mined per wire rope dollar.

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M. C. Henry Jr., health director; Joe Haywood, George Smith, Roosevelt Hazard, V. L. Hancock, Robert Craig, and Ray Ingole, executive committee members.

105 Teams to Compete in Pennsylvania First Aid Meet

Some 105 teams from bituminous areas of the state are expected to participate in the Annual Pennsylvania First Aid Meet scheduled for Sept. 12 at the Cambria County Fair Grounds, Ebensburg, Pa. District meets are being held during the summer to select the top teams in each area for the Ebensburg competition, as follows; Indiana North Central Safety Association, July 18, Indiana, Pa.; Allegheny Kiski Safety Association, July 25, New Kensington; Central Pennsylvania Safety Association, Aug. 1, Portage; and Southwestern Pennsylvania Safety Association, Aug. 15, Waynesburg. The schedule was started in June with contests sponsored by the Westmoreland Safety Association and the Moshannon North Central Safety Association. W. Garfield Thomas, Pennsylvania Deputy Secretary of Mines, was renamed president of the organization sponsoring the state-wide competition. Other officers include William Morris, vice president; George P. Resick, secretary; and Maurice Coulter, treasurer.

Old Timers' Club Honors Mining Engineering Students

JAMES K. MULLINS (above), Coeburn, Va., a senior at Virginia Polytechnic Institute, was one of several students to receive a gold watch awarded by the Old Timers' Club, an organization of veteran coal operators and machinery manufacturers. The awards are presented annually to the outstanding senior in coal mine engineering at various institutions. Dr. Lewis E. Young presented the watch to Mr. Mullins at a banquet of the VPI Burkhart Mining Society. At Penn State College, E. H. Jenks, engineering assistant to the president of the Hanna Coal Co., presented the award to Gunther Badorrek at a dinner of the Student Chapter of the AIME. Lawrence H. Lund Jr., outstanding senior at Lehigh University, received his watch from M. D. Cooper, NCA director of Mining Engineering Education, at a meeting of the AIME Student Chapter. Robert E. Lewis, New Lexington, Ohio, was the recipient at Ohio State University. Mr. Lewis' father is David J. Lewis, a member of the Ohio legislature and chairman of the Mines Committee of the Ohio House of Representatives. At the University of Illinois, Darwin E. Neihaus, of West Frankfort, was presented with the award by Harry M. Moses, president of the BCOA. Mr. Neihaus is the son of an employee of the Old Ben Coal Corp. and is presently employed by the Sahara Coal Co.

Fatality Rates Continue Down

Fatality rates per million tons for the first 5 mo of 1953 reflect continued improvement in both the bituminous and anthracite industries, according to preliminary figures released by the USBM last month. In bituminous, the rate of 0.87 for the 5 mo of 1953 compares to 1.01 for the same 1952 period and the estimated rate of 0.96 for the entire year of 1952. The May rate of 0.67 was slightly over the April figure of 0.65, the best so far this year. In anthracite, the 2.66 rate for the first 5 mo of 1953 showed improvement over the rate of 2.84 for the same period in 1952 but was still behind the 2.48 rate estimated for 1952 as a whole.

New Coal Mining Code Passes Illinois Legislature

The Illinois Senate June 17 passed by a vote of 37 to 1 a new state coal mining code "called the best mining law in any state in the country" and sent it to Gov. William G. Stratton for signing. The law, which reportedly was backed by the union and "90% of the coal-mining industry," was introduced into the legislature May 4 under the governor's sponsorship. In addition to the many revisions in mining practices, the new law requires withdrawal of men from working sections when methane content reaches a certain point; permits miners to be searched for cigarets before entering a mine; requires sealing or ventilating of abandoned working areas; calls for continuous inspection for gas; and provides that state inspectors take laboratory samples of coal dust and gas.

P&R Grants College Scholarship

The Ralph E. Taggart Memorial Scholarship in Mining Engineering for 1953 has been awarded by the Philadelphia & Reading Coal & Iron Co. to Frederick W. Glowatsky, a member of the graduating class of the Ringtown (Pa.) High School. The full scholarship was established in 1951 as a memorial to the late Ralph E. Taggart, P&R president, who died that year. Mr. Glowatsky, who will enter Lehigh University this fall, was one of 11 applicants from various high schools within P&R's three operating divisions judged on the basis of their college entrance examinations and high school records. Formal presentation of the award was made at Mr. Glowatsky's graduation by Edward A. Lynch, public relations counsel for P&R.

Bituminous Output Holds Up

In three of the four weeks ending June 13, 1953, bituminous coal production was above the output noted for the same weeks of 1952, according to USBM estimates. For the year through June 13 output totaled 202,885,000 tons, 9.8% under the same period in 1952 and reflecting an upward trend that began in mid-April. Up to the week ending April 11, for example, 1953 tonnage was 18.4% under the same period of 1952, but by May 16, the 1953 loss had been lowered to 13.7%. In anthracite, 1953 output through June 13 was 13,398,000 tons, down 28.7% from 1952. On both April 11 and May 16, anthracite's loss from the previous year stood at 32.5%.

EQUIPMENT APPROVALS

Twelve approvals of permissible equipment were issued by the U. S. Bureau of Mines in May, as follows:

Joy Mfg. Co.—Type 1CM-1E continuous coal miner; four 7½-hp, one 15-hp and two 65-hp motors, 250 v, DC; Approval 2-934; May 4.

Goodman Mfg. Co.—Type RMT tractor-tread truck; 10-hp motor, 220 v, AC; Approval 2-935; May 6.

Goodman Mfg. Co.—Type 582-4 cable-reel shuttle car; four 10-hp motors, 250 v, DC; Approval 2-936; May 6.

Joy Mfg. Co.—Types 10SC2BPE-2 and 10SC2BPXE-2 cable-reel shuttle cars; two 5- or 7½-hp and three 15-hp motors each, 250 v, DC; Approval 2-937; May 7.

Joy Mfg. Co.—Type 10SC-2BPE/8AE/BE loading machines; one 4-hp and four 15-hp motors, 250 v, DC; Approval 2-938; May 13.

Myers-Whaley Co.—Crawler-mounted-type shuttle car; 20-hp motor, 230 v, DC; Approval 2-939; May 13.

Joy Mfg. Co.—Type 10SC-2BPE PXE cable-reel shuttle car; two 5-hp and three 15-hp motors, 250 v, DC; Approval 2-940; May 18.

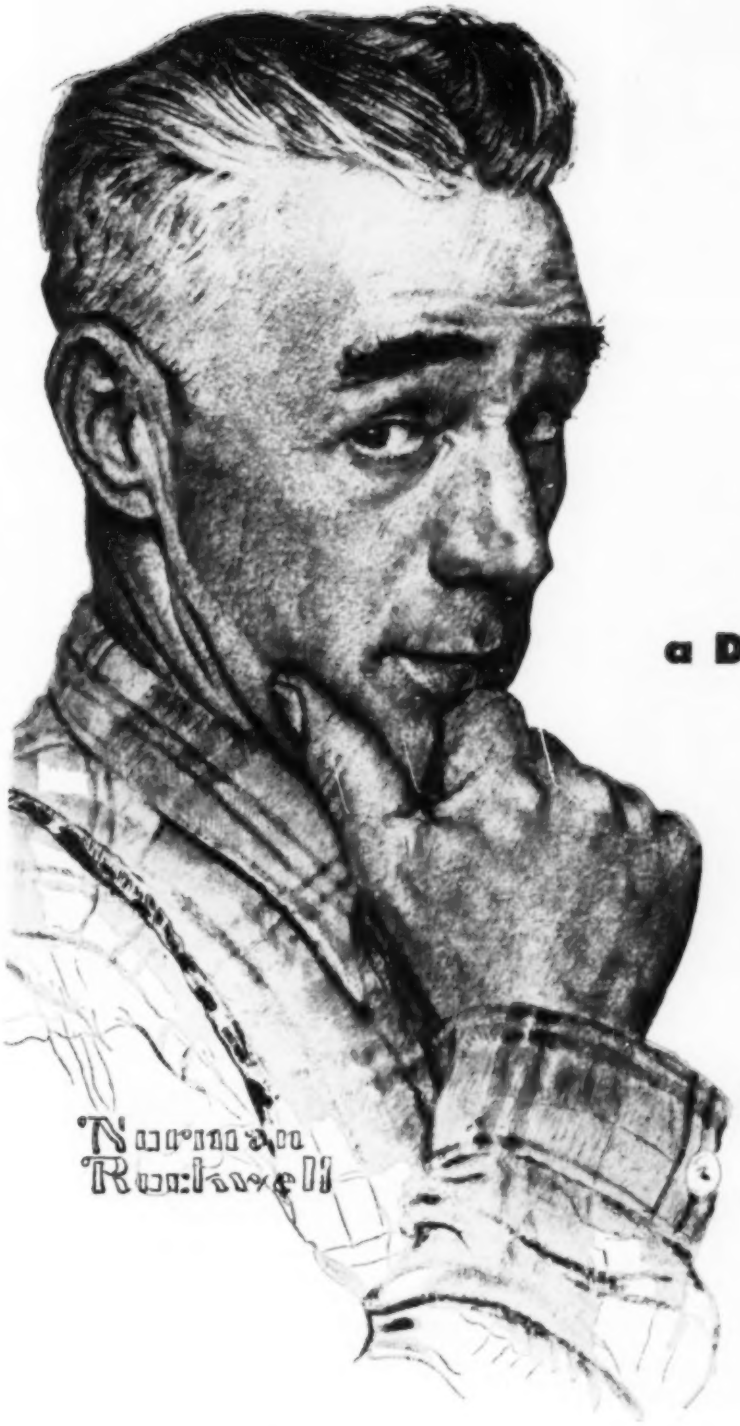
Joy Mfg. Co.—Type CD-42 double-boom coal-drilling machine; 26-hp motor, 250 and 500 v, DC; Approvals 2-941 and 2-941A; May 27.

Jeffrey Mfg. Co.—Type ML-81-A loading machine; one 2-hp and four 10-hp motors, 250 v, DC; Approval 2-942; May 27.

Koehler Mfg. Co.—No. 274 flame safety lamp; Approval 211; May 6.

Transocean Commerce, Inc.—Type 17 Riken methane indicating detector; Approval 810; May 11.

Joy Mfg. Co.—Type 60-E-12-1 diesel electric shuttle car; Approval 2402 under Schedule 24; May 15.



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TAXES, COAL FOR CHEMICALS—Richard Gorman (standing, left), Carbide & Carbon Chemicals Co.; E. L. Snoderly, Consolidation Coal Co. (W. Va.); seated, left, Arch J. Alexander, institute president; James F. Trotter, Trotter Coal Co.; George McCaa, Jamison Coal & Coke Co.

EUROPEAN LONGWALL MACHINES—J. D. A. Morrow, Joy Mfg. Co., luncheon speaker, with George McCaa (left); James F. Trotter; Tom Pickett, executive vice president, National Coal Association; and Truman E. Johnson, Northern West Virginia Coal Association.

RESIDUAL OIL—Tom Pickett, executive vice president, speaking at the dinner, with listeners including Mrs. George R. Higinbotham (left); G. R. Spindler, West Virginia University School of Mines; Arch J. Alexander; and Mrs. George L. Judy.

SAFETY, DEGASIFICATION, GAS STORAGE—M. J. Ankeny (left), Bituminous Coal Operators' Association; George R. Higinbotham; George L. Judy (standing), Consolidation Coal Co. (W. Va.); G. R. Spindler; and Ray Henderson, Consolidation Coal Co. (W. Va.).

Progress and Problems W. Va. Themes

DEGASIFICATION OF COAL SEAMS, longwall mining machines in Europe, taxes, hydrogenation of coal for chemicals, underground gas storage, and the Federal Coal Mine Safety Act were topics at the spring meeting of the West Virginia Coal Mining Institute, Fairmont Hotel, Fairmont, W. Va., June 5-6. At the dinner, Arch J. Alexander, institute president presiding, Tom Pickett, executive vice president, National Coal Association, discussed the political complexion and geographical distribution of members of Congress and other factors influencing the chances for legislation giving the coal industry some relief from residual-fuel imports.

Chairmen of the meeting committees were: George McCaa, general manager, Jamison Coal & Coke Co., program; and George L. Judy, general superintendent, Consolidation Coal Co. (W. Va.), arrangements. Chairmen of the technical sessions were: James F. Trotter, president, Trotter Coal Co.; and George R. Higinbotham, president, Consolidation Coal Co. (W. Va.). The Greenbrier Hotel, White Sulphur Springs, was selected for the fall meeting, with tentative dates as Nov. 5-6.

INDUSTRY MEETING — A Special COAL AGE Staff-Written Report

LONGWALL MACHINES

The longwall machine now most popular in Great Britain is the Gloucester Getter, developed by Joy and manufactured at its English factory, said J. D. A. Morrow, president, Joy Mfg. Co., speaking at the institute luncheon. He reported on the Mark IV model, which went into use March 16, 1953, and has worked 50 shifts without a breakdown. Sulmet bits cut 1 mi of face before replacement, and chains cut 2 mi before being rebuilt. Pulled along the face by a

(*Continued on p. 170*)

"Sinclair Lubricants Cut DOWNTIME"

Coking coal used to process steel for the Lone Star Steel Company is mined at the company's own modern, mechanized mines in McAlester and McCurtain, Oklahoma.

Their coal mining machinery is protected in its rugged every day operation by 5 selected Sinclair Lubricants.

Mr. Campbell R. Cameron, General Superintendent of Coal Mines, says, "Sinclair Lubricants give thorough lubrication . . . with minimum wear . . . and maximum runs between overhauls. The result is . . . considerable savings in maintenance costs, *less downtime* and less replacements needed."

In addition, the simplified lubrication procedure set up by Sinclair Lubrication Engineers has enabled Lone Star to cut lubricant expenditures by minimizing waste.

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SINCLAIR LUBRICANTS

FOREIGN MINING, INCENTIVES, SAFETY—H. O. Zimmerman (seated, left), Charles T. Holland, G. R. Spindler, George O. Tarleton and C. H. Hodgson; standing, left, Herbert E. Jones, Lee D. Siniff, Acel Garland and M. J. Ankeny.

INDUSTRY PICTURE—Lee D. Siniff (left), A. D. Sisk, Joseph E. Moody (speaking), E. M. Spokes, G. R. Spindler and Acel Garland.

UTILIZATION, LEGISLATION, REMOTE MINING—H. M. Gallaher (left), R. H. Hughes, Carroll F. Hardy and O. S. Batten.

Appalachian Section Scans Coal Problems

GAS AND OIL OPERATIONS, coal mining in Germany and Turkey, incentive plans in coal mining, coal utilization, Public Law No. 552, and the Carbide miner were the topics of the spring meeting of the Central Appalachian Sec., AIME, at the Hotel Beecher, Somerset, Ky., June 12-13.

Chairmen of the two technical sessions were: George Tarleton, vice president, Consolidation Coal Co. (Ky.); E. K. Newman, general manager, Wisconsin Steel Nos. 1 and 2 mines, International Harvester Co.; H. M. Gallaher, superintendent, Harvey mine, Harvey Coal Corp.; and R. H. Hughes, president, Clinchfield Coal Corp. Joseph E. Moody, president, Southern Coal Producers' Association was speaker at the opening-day luncheon, with Ernest M. Spokes, assistant professor, mining engineering, University of Kentucky, presiding. G. R. Spindler, section chairman and director, School of Mines, West Virginia University, presided at the banquet, at which the speaker was William G. Caples, president, Inland Steel Container Co., Chicago. Chairman of the program committee was H. O. Zimmerman, chief engineer, Inland Steel Co. coal mines, with C. H. Hodgson, district manager, Mine Safety Appliances Co., heading the arrangements committee.

INDUSTRY MEETING — A Special COAL AGE Staff-Written Report

MINING ABROAD

Safety rules are so strict that few electric locomotives are employed in the Ruhr district of Germany, said Herbert E. Jones, vice president, Amherst Coal Co., Lundale, W. Va., in describing mining practices in that area. The Germans think diesel locomotives are safer and cheaper. Mr. Jones was one of a group of seven employed by the Mutual Security Agency to offer technical assistance to the German mining industry. The Ruhr mines have been working six days per week since 1938, and will continue at that rate for at least 2 yr more.

Ruhr coal miners, said Mr. Jones, are perhaps the most highly trained men anywhere today. Ruhr mining practices are highly developed, and the region is a major world producer. Seams generally are classified as follows in western Germany: flat, 0 to 25 deg; semi-steep, 25 to 70 deg; steep, above 70 deg. About 30% of the coal comes from steep formations. Coal plows often produce 1,000 tons per face per shift but the cost of backfilling to minimize subsidence often exceeds the cost of taking out the coal. In Germany, the management is much farther removed from the miner than in the United States, perhaps making labor

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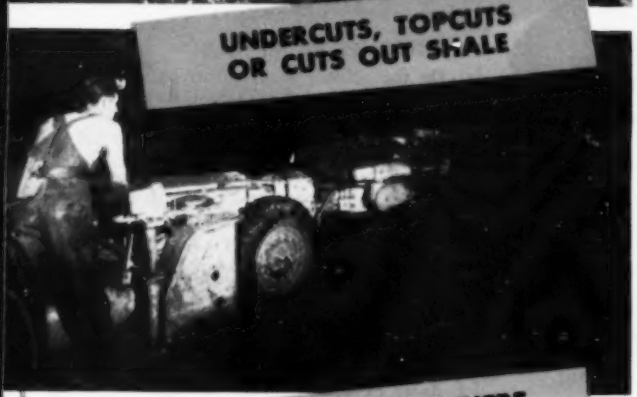

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Only 31" high for trackless operation in medium low coal, the Joy 11-RU Universal Cutter has the extreme flexibility, speed and maneuverability that keeps your cutting costs in check . . . plus the ruggedness that means day-after-day dependability and low maintenance. Available with the famous Joy Bugduster, if desired . . . and when a Joy Cutter is equipped with Sulmet Bits, you have a combination that has given best results and lowest bit cost per ton in every mining field.

Joy makes a complete line of coal cutters for every mining system, and a range of tungsten carbide bits to meet every seam condition. ● Let us work with you. ***Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.*** In Canada, *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

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relations there more difficult to carry on.

Rehabilitation of the mines as they were being recaptured from the Nazis was briefed by John P. West, mining engineer, Roland Land Co., St. Albans, W. Va., in discussion. Max H. Forester, vice president, Pittsburgh Consolidation Coal Co., observed that mining is much more highly regarded by the public than in the United States. Other details on German mining were contributed by J. B. Benson, chief, Norton (Va.) branch, U. S. Bureau of Mines.

Turkish mining in general and specific experiences in installing DC power equipment at the Soma lignite mine were described by Lee D. Siniff, J. H. Fletcher & Co., Huntington, W. Va., who was employed by the Turkish government, which also is the mine operator. At Soma, a solid block of coal on a 30% pitch and 30 to 130 ft thick is opened by a slope down to the 500-ft level. The mining is on long faces, with hand loading onto chain conveyors. The mine is served by a McNally Pittsburg cleaning plant and DC power is supplied to underground equipment through a General Electric rectifier. Six college graduates with master's degrees are regularly employed at Soma, which produces 900 tpd and works seven days per week.

Annual production in Turkey has been about 3,000,000 tons per year. Since Turkey is almost barren, timber is imported from Norway. The seams are very gaseous and deep. In one locality, a 4-mi rock entry is being developed to mine an area 1,000 ft deep. Salaries of nine officials are based on education and raises come automatically every 2 yr. The men, therefore, are reluctant to make decisions which may result in mistakes and thus interfere with raises. With the bonus system in effect, it is possible for a man to earn 17 mo salary in 12 mo. Coal costs $6.50 to $9 per ton at the mines. Soma mine has achieved an efficiency of 1.6 tons per man employed, which is considered very good.

INCENTIVES IN MINING

On the subject of inventive plans in coal mining, Acel Garland, director of industrial engineering, Island Creek Coal Co., expressed the opinion that standards can be set and applied fairly, and thus will produce the 50% gain in efficiency that is necessary. To get section foremen and men to react to an incentive, the standards must have a firm basis so that men will believe in them, and the company must train management and men so that all will thoroughly understand the standards. Every operation in the mine can be standardized if one does not try to be too exact.

As an example, Mr. Garland cited the open hearth in the steel industry. Until a few years ago, it was not thought that such an operation could be standardized, but now open hearths are operating on a sound incentive plan. Island Creek uses a bonus plan and in that connection has classified and set a measure for all types of equipment and all conditions, such as, good and bad top, grades, rock partings, etc. Mining, Mr. Garland contended, has much better labor than the manufacturing industries—that is, labor will come

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AIRDOX

NON-EXPLOSIVE MINING METHOD

can cut your cost of face preparation

This is admittedly a broad statement.
It is supported by the fact that AIRDOX has proven *in mine after mine* that it produces coal at lower cost per ton than any other mining method.

1. **The actual cost of dislodging is less with AIRDOX in practically every case.**
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closer to giving a day's work under adverse conditions and delays. A few companies, he stated, have developed sound bases for labor measurement, and should be in position to install incentive plans.

Following Mr. Garland, M. J. Ankeny, safety director, Bituminous Coal Operators' Association, presented an analysis of the Federal Mine Safety Act (Public Law No. 552), and advised against any states or companies entering into cooperative agreements under that law (see p 170 of this issue).

UTILIZATION AND MARKETING

Summarizing his comments on trends in coal utilization and their effect on coal marketing, Carroll F. Hardy, chief engineer, Appalachian Coals, Inc., emphasized the following: Since the trend in utilization is toward the smaller sizes and that trend will become more pronounced, the industry must get enough for these small sizes to make a profit, and customers must be made to realize that a healthy coal industry is an asset and a necessity for all American industry.

Mining costs can be cut by improving methods and machinery as fast as realization can be cut by lack of proper marketing and proper application of coal. Only through united effort can new equipment and service be developed which may regain part of the serious loss to gas and oil. The coal-fired gas-turbine locomotive, when it goes into widespread production, will recover part of the railroad business. As a whole, the coal industry gives too little support and cooperation to agencies that are selling coal's superior economy, safety and other advantages to halt the day-by-day loss of large and small industrial plants to gas and oil. Work directed toward the better design of coal-burning plants, proper maintenance and supervision, and plans for expansion, should be "doubled and redoubled," Mr. Hardy declared. Coal salesmen need to be experts in coal selling, not just expert salesmen. Recognizing the present situation, responsible producers and sales companies should make a concerted effort to convince responsible customers that a fair and adequate price for coal is a good investment.

Mr. Spindler, in discussion, warned that coal must compete for markets on a cost basis, and cited the new plant of the Monongahela Power Co., at Albright, W. Va., where only small hand-loading mines exist. Designed to burn poor coal the plant is getting fuel for about 11½c per million Btu, or about $2 per ton delivered at the plant.

LEGISLATIVE REVISIONS

Taking the position that revision of state law applying to the coal, oil and gas industries is necessary, O. S. Batten, consulting engineer, Pikeville, Ky., recommended that the following eight conditions be covered in legislation:

1. Complete definitions.
2. Better location and mapping of coal mines.
3. Better location and mapping of wells.
4. Protection of coal seams during the drilling and operation of wells through them.
5. Cooperation of the industries in

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NEW BOWDIL 1-29 . . .

The concave shape stays sharp as it wears away. That means:

1. Easier cutting
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4. More profitable stoker
5. Less bug-dust
6. Less drag
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9. Less maintenance on your mining machines

. . . and the DOUBLE POINT DOUBLES YOUR SAVINGS!

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GREATER CUTTING FACE

PATENTED CONCAVE SHAPE STAYS SHARPER LONGER

SPECIAL ALLOY TOOL STEEL

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The Lee-Norse TJ1 Mine Jeep gets you there safely! Here's the best answer for speedier underground transportation to and from working faces and emergency areas for mine superintendents, engineers, inspectors and maintenance personnel. A versatile performer the Lee-Norse Jeep can be used to pull man-trip cars, fire-fighting equipment and can be quickly placed in service as an ambulance. Detailed data available on request. Write now!

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No reason for mechanics, pumpers, fire bosses and other maintenance personnel to lose valuable time hitch-hiking when there is a Lee-Norse Scooter at hand. Weighing approximately 1000 lbs., the Scooter is popularly priced and its low-operating cost fits into every mine budget. The Scooter has a 48" wheelbase, is 9' in overall length and is available in all track gauges from 36" to 48". Where time is a factor the Lee-Norse Scooter is a "must". Send today for complete information and prices.

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locating, building and maintaining pipe lines over coal-bearing areas.

6. Better, uniform logging of wells.

7. Assurance, by bond and otherwise, that wells will be properly plugged and sealed.

8. Control of underground gas storage in coal-bearing areas to eliminate all hazards to coal mining.

To point up the need, Mr. Batten cited many instances of mining dangers from gas wells and gas lines.

There is not too much wrong with present drilling and plugging practices, said David Young, chief geologist, Clinchfield Coal Corp., Dante, Va., since some 10,000 wells have been drilled in coal areas of West Virginia and Kentucky without a major disaster. Drilling has been going on in Virginia only since 1948, and some 100 wells have been put down to date. Clinchfield is drilling through its coal measures, and the Hope Natural Gas Co. also is drilling on Clinchfield property.

Reasonable legislation to protect the interests of all parties involved in oil, gas and coal operations is necessary and can be worked out to protect the "good people" of the industries against the few "pirates," said A. D. Sisk, chief Kentucky Department of Mines and Minerals. Legislation, he stated, should provide for public hearings before establishment of an underground gas-storage pool. While all the coal can be mined from around a properly plugged well, Mr. Sisk continued, mining cannot be permitted unless it is certain that proper plugging has been done.

Many reasons for regulation of drilling through coal seams were offered by Noah Howard, general manager, Elkhorn Coal Corp. There are 1,200 wells on Elkhorn property which penetrate, on the average, three seams of coal. With an acre pillar at each penetration, that means 4,800 acres of coal lost.

The gas companies are doing a good job, Mr. Howard noted, but some are leasing to unsatisfactory subcontractors. Elkhorn has coal it expects to mine 75 yr from now when all the gas is gone. Proposed drilling patterns should be provided to the coal company so that they can be changed slightly, in some instances, to eliminate interference with straight projections for belts or mine haulage. Proper logging is a must, since otherwise improper plugging may result. Bleeders on plugged wells are an admission that plugging has not been done properly. In one instance, the state shut down a mining section 800 ft from a gas well, and the situation was corrected by fixing the well.

REMOTE MINING

The Carbide miner was presented in film and general discussion by J. R. Reid and J. D. Newlon, Carbide & Carbon Chemicals Co., S. Charleston, W. Va. Total payroll is 38 men for 1,200 tpd delivered to the storage pile. Leaving a 3-ft pillar, the only trouble from falls has been at the highwall. No trouble is encountered farther underground when one complete hole is made per day.

Penetration now is 1,000 ft. The limit on possible depth will be voltage drop in

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COAL CRUSHING EQUIPMENT

McLANAHAN

Backed by 117 years of manufacturing experience, McLanahan builds crushing equipment for the ultimate in economy through long service and minimum maintenance costs. This equipment, which has been thoroughly service-proven on the most demanding of domestic and foreign installations, is available in a great variety of sizes for every coal crushing requirement. A pioneer in the development of many types of crushing equipment—including the first single roll crusher produced in 1894—McLanahan is equipped to produce complete units, from feeders, primary and reduction crushers through elevators, sizing screens, etc.

WRITE FOR BULLETINS: Separate bulletins are available on all the crushers shown, and on a wide variety of other equipment.

Single Roll Rockmaster Crusher for both primary and secondary crushing. Used to crushing mine refuse, sulphur balls, sand rock, slate, etc. *Bulletin RM-505.*

Single Roll Black Diamond Crusher with exclusive automatic steelstrut toggle and quick adjustment. *Bulletin BD-457.*

McLanahan Double Roll Crusher for various reductions of medium-size feeds. *Bulletin DR-447.*

The low cost McLanahan Bantam Buster Single Roll Crusher. *Bulletin BB-513.*

McLANAHAN & STONE CORPORATION

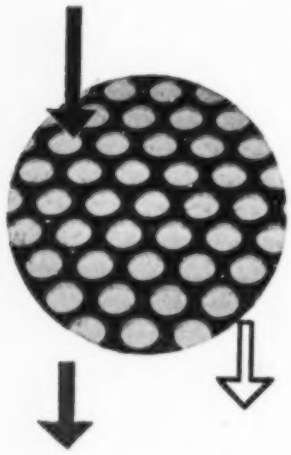
Pit, Mine and Quarry Equipment Headquarters Since 1835

Hollidaysburg, Pennsylvania

Dependable Products: Single and Double Roll—and Jaw Crushers, Crushing Plants, Reciprocating Plate and Apron Feeders, Rail Grizzlies, Conveyors, Elevators, Screens, Scrubbers, Steel Log Washers, Sand Drags, Hoists, Jigs, Dry Pans, Dryers, Scrap Bonders, Pulleys, Gears, Bearings, Sprockets, Sheaves, Rollers, Bin Gates, Elevator Buckets, Gratings, Car Wheels, Ferrous and Bronze Castings.

In Coal Preparation

it's the SIZE that counts!



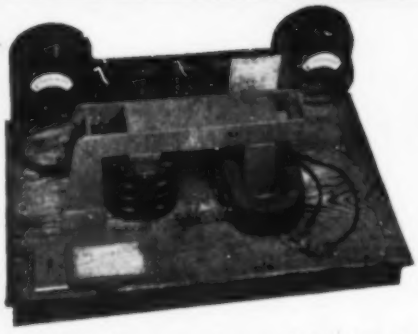
You can rest assured your material will be accurately sized if you use Hendrick Perforated Plate on vibrating and shaking screens. With Hendrick Perforated Metal Plate, screens last longer, openings remain uniform under constant, heavy-duty usage.

Delays due to costly blinding are reduced to an absolute minimum – decks can be changed easier, faster–and downtime for repairs is practically eliminated – when Hendrick Perforated Plate is used.

Available flat, corrugated or stepped with any desired shape and size of perforation in proper gauges of regular, high carbon, and high tensile steels and in other commercially rolled metals. Write for more details.

Hendrick
MANUFACTURING COMPANY
41 DUNDAFF STREET, CARBONDALE, PA.
Sales Offices in Principal Cities
PERFORATED METAL • PERFORATED METAL SCREENS • WEDGE-SLOT SCREENS
ARCHITECTURAL GRILLES • MITCO OPEN STEEL FLOORING • SHUR-SITE TREADS • ARMORGRIDS

Cut Repair Costs!



Flood City FIELD COIL TESTING MACHINE

Quickly and positively locates faults in field and armature coils

Simple to operate, the Flood City Field Coil Testing Machine provides a quick means of locating faults in field and armature coils. With series coil under test even a single short circuited turn instantly registers on the ammeter. Shunt fields are tested by measuring the induced voltage as compared with that of a standard coil.

FLOOD CITY
BRASS & ELECTRIC CO.
JOHNSTOWN, PA.
Branch Office:
[illegible] Virginia St., W., Charleston, W. Va.

power cables and the ability of the machine to pull in a long line of conveyors. The coal is No. 5 Block–a hard splint–and the average is about one complete change of bits per hole. Traction is provided by two motors with separate cables. Thus there is little chance that all motors will fail, leaving none to bring the machine out. Seam rolls can be followed provided the grade does not exceed 1 in 12.

Preparation Facilities

Compass Coal Co., Elk Creek mine, Philippi, W. Va.–Contract closed with Fairmont Machinery Co. for addition to present plant of R-O-M belt conveyor 48 in wide by 1,114-ft centers, 118-ft lift with a 650 tph capacity.

West Virginia Coal & Coke Corp., Dorrance Colliery, Omar, W. Va.–Contract closed with Fairmont Machinery Co. for addition to present plant of conveyors and equipment to increase foreign-coal-handling capacity from 400 to 600 tph.

Consolidation Coal Co. (W. Va.), No. 32 mine, Owings, W. Va.–Contract closed with Fairmont Machinery Co. for addition to present plant of conveying and drying equipment consisting of three Verti-Vane thermal coal driers treating 3/8x0 at 180 tph and reducing surface moisture to approximately 3½%.

Seminole Coal Corp., Lenzburg, Ill.–Contract closed with McNally Pittsburg Mfg. Corp. for pre-screening and McNally Tromp dense-media washer addition, treating crushed R-O-M screened at 1½ at 250 tph; 7½x0 to be cleaned in McNally Tromp dense-media bath at 200 tph; 1½x0 raw coal to be cleaned in existing McNally Norton unit washers.

Harlan Fuel Co., Yancey, Ky.–Contract closed with Jeffrey Mfg. Co. for sizing, crushing and loading equipment processing R-O-M at 500 tph.

Rochester & Pittsburgh Coal Co., Ernest mine, Ernest, Pa.–Shipment by Deister Concentrator Co. of four Super-Duty Diagonal-Deck No. 7 coal washing tables and one Model 108 Concenco 4-way revolving feed distributor.

Rochester & Pittsburgh Coal Co., Kent No. 1-2 mine, McIntyre, Pa.–Shipment by Deister Concentrator Co. of one Model 108 Concenco revolving feed distributor for 14-way feed distribution.

Pennsylvania Water & Power Co., Safe Harbor, Pa.–Shipment by Deister Concentrator Co. of one Model 108-B Concenco revolving feed distributor for 3/2-way feed distribution.

Oglebay, Norton & Co., Richwood-Sewell Coal Co., Burton Mine, Allingdale, W. Va.–Contract closed with Robert Holmes & Bros., Inc., for one Baughman Verti-Vane thermal coal-drier unit, to handle wet feed of 60 tph of 1¼ x 28M raw coal, for reduction of surface moisture to approximately 3%.

Oglebay, Norton & Co., O. K. Coal, Inc., N. Industry, Ohio–Contract closed with Robert Holmes & Bros., Inc., for one Baughman Verti-Vane thermal coal-drier unit, to handle wet feed of 50 tph of 1¼ x 28M washed coal, for reduction of surface moisture to approximately 3%.

QUICK

Interchangeability

YOU CAN USE WILMOT RIVETLESS CHAIN FOR ANY REPLACEMENT

WILMOT REPRESENTATIVES

BIRMINGHAM 4, ALA. -- Ames A. Culp, 930 Second Ave., North

CHARLESTON 23, W. VA. -- Cross Pump & Equipment Co., P. O. Box 889

DENVER, COL. -- Kendo Equipment Co., P. O. Box 4202, So. Denver Station

HAZLETON, PA. -- Wilmot Engineering Co., Markle Bank Bldg.

HONOLULU 6, H. I. -- P. S. Pell & Co., Ltd., 88 S. Queen St.

KNOXVILLE, TENN. -- Crowell Engineering & Sales Co., 3045 Sutherland Ave.

PITTSBURG 16, PA. -- Harold C. Lusk, 3045 W. Liberty Ave.

ST. LOUIS 5, MO. -- Jack Van Horn, 7543 Cromwell Drive

SALT LAKE CITY, UT. -- Western Sales Engineering Co., 375 South West Temple

NEW YORK 38, N. Y. -- International Manufacturing & Equipment Co. (export only), 220 Broadway

Wilmot "Keystone" chain will interchange with the same size number of ANY other rivetless chain. Add to this the fact that, as originators of rivetless chain, Wilmot offers the largest choice of sizes. These two important advantages are enabling an increasing number of leading firms to simplify conveyor maintenance and, at the same time, cut spare part inventories.

EVERYTHING FOR YOUR CONVEYOR

Wilmot has, or will design, everything for your conveyor from drive to take-up. For instance, in the Wilmot catalog of rivetless chain conveyors you will find by far the largest listing of chain attachments; furnished in malleable iron, drop-forged steel and cast carbon or alloy steels. It also lists the largest choice of chain sizes: pitches from 3" to 10½" and in working loads from 3,000 to 130,000 lbs.; of drop forged steel, alloy or cast chrome-manganese. Depend on Wilmot for all replacements.

Send for 248-page Book on Chain and Conveyors

WILMOT ENGINEERING CO. HAZLETON, PA. *Plant:* WHITE HAVEN, PA.

Designed by coal miners for coal miners

NEW HARD BOILED* Coal Miner's Cap

This is the cap that has been acclaimed by many in the industry as the greatest development in Coal Caps in years.

Designed for GREATEST PROTECTION! Built of rugged light weight Fiberglas. Surpasses all standard safety tests, and is approved by the state of Pennsylvania. Deep groove in crown secures lamp cable, gives more headspace, acts like a girder for extra strength. The flared raintrough edge, all around the hat, protects ears from being nicked and keeps water from running down a man's back. Fiberglas is flame resistant and passes dielectric tests eliminating all fear of electrical hazards.

Designed for "FELT HAT" COMFORT! Free floating hammock suspension guarantees a perfect fit always with plenty of room for air circulation. Headband size can be adjusted in just a few seconds or when needed completely changed with inexpensive leather or leatherette headbands.

FREE brochure on Bullard Safety Miner's Caps. Write

E. D. BULLARD COMPANY

275 Eighth Street, Dept. A-7 San Francisco, Calif.

Distributors everywhere

HARD BOILED — EVERYTHING BULLARD IN SAFETY

*T. M.'S REG. U. S. PAT. OF.

COAL MEN ON THE JOB . . .

BEN HUR COAL CO., Henryetta, Okla. —P. Wills (above, left), federal mine inspector; J. A. Roberts, superintendent; F. S. Butler, third-shift foreman; L. W. Cady, top foreman; J. Johnson, state mine inspector; Tony Drizness, mine safety committeeman; John Vanmeter, safety committeeman and member of the state mining board; Ed Looney (right photo), mine foreman; J. Leonard, second-shift mine foreman; and J. Roberts, chief electrician.

CELAB RECTIFIERS

OVER 10,000 IN SERVICE

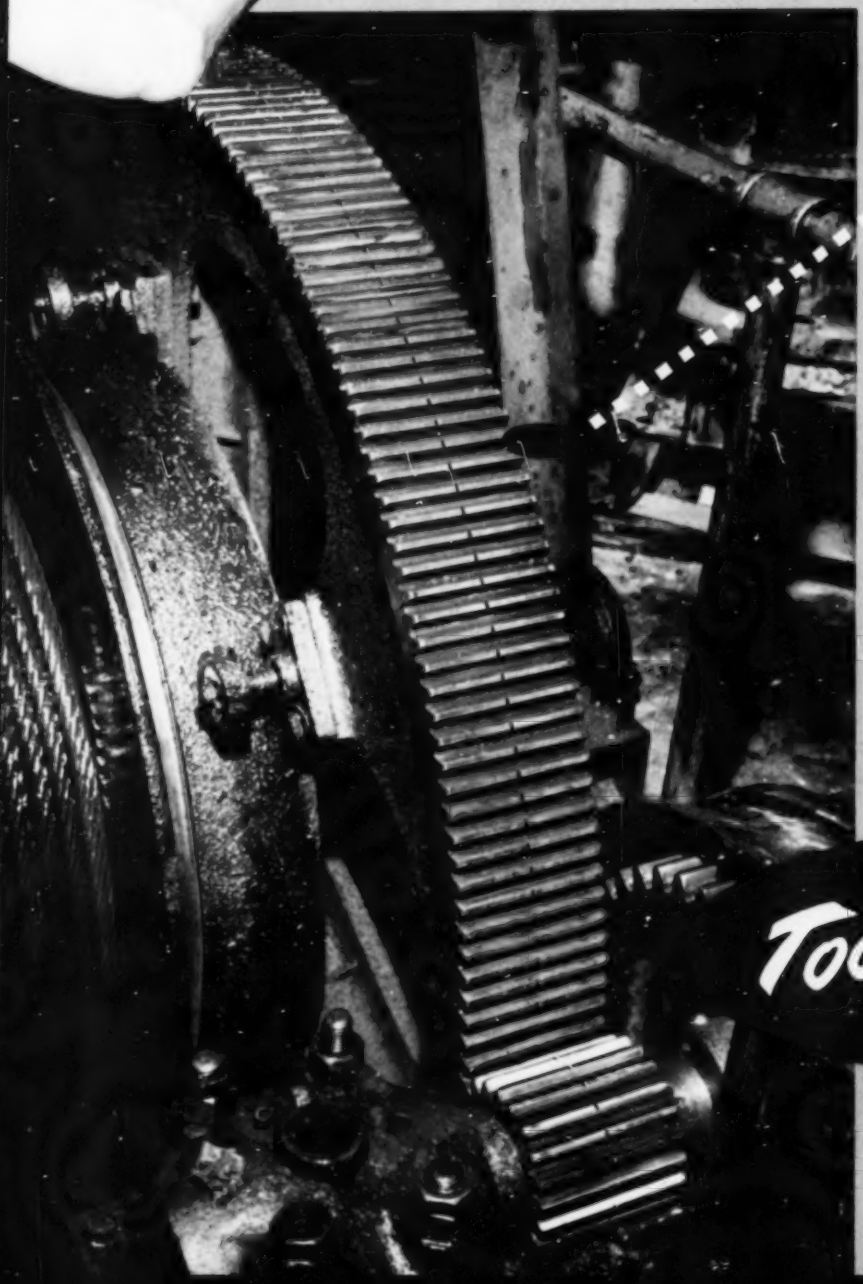
WRITE FOR NEW LOW PRICES NOW IN EFFECT

ALL SIZES FROM 25 TO 500 K.W.

CLARK ELECTRONIC CORP.

BOX 165, PALM SPRINGS, CALIF.

will yours look this good after... 14 YEARS



This TSP Drum Gear and Pinion was installed in 1939 on a 40 H.P. Man and Supply Hoist at the Carbon Fuel Co., Carbon, West Virginia. Gears and pinions they replaced lasted only two years. TSP Drum Gear and Pinion are still in operation less than 50% worn.

Here's why: "Tool Steel Process" Gears and Pinions are made of low carbon alloy steel. File-hard wearing surfaces are backed by a tough ductile core, resulting in super resistance to wear and fatigue.

You receive an absolutely positive written GUARANTEE that TSP Products will give a longer life in the same service than any other product.

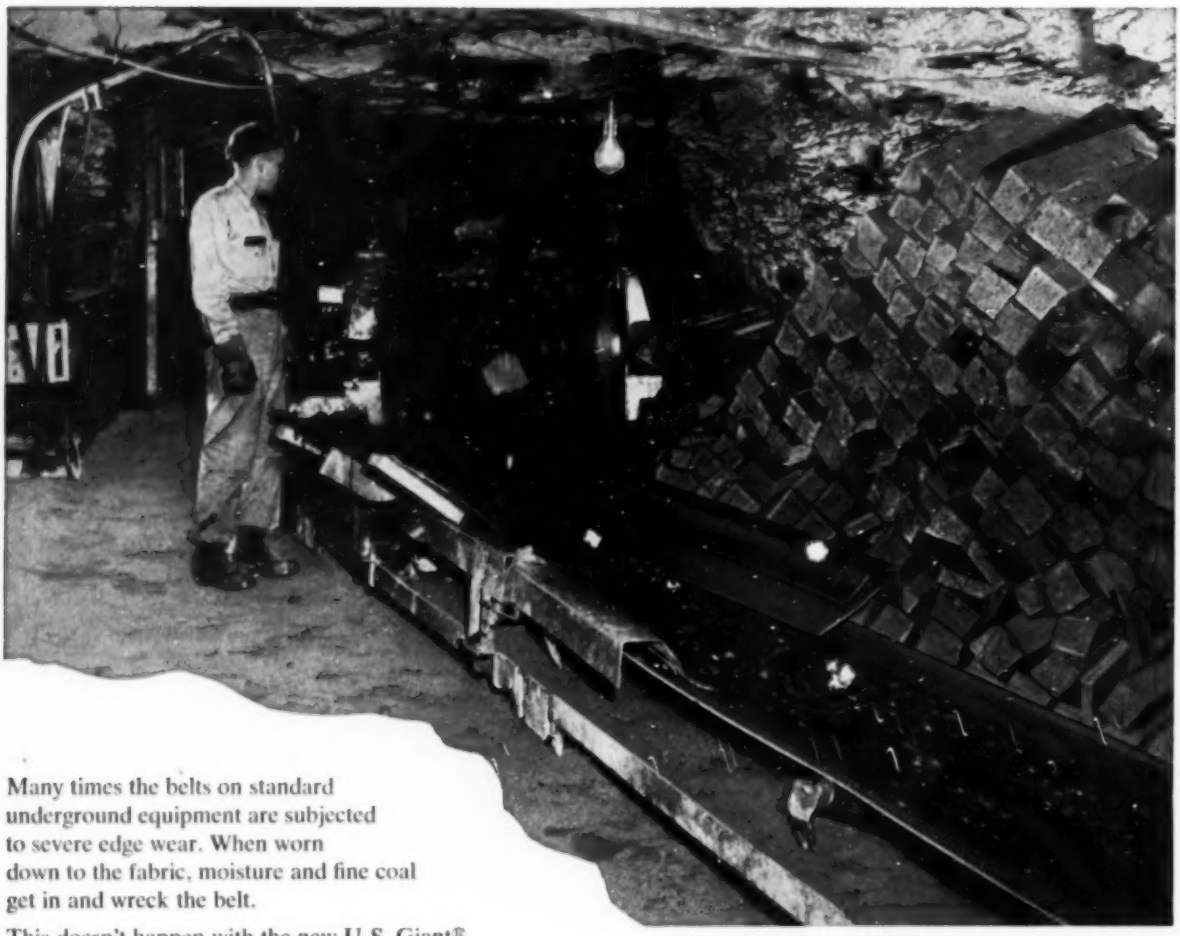
Specify "Tool Steel Process" Products today! Write for Bulletin 252.

TOOL STEEL

Ad No. 10

The Standard of Quality Since 1909 for
Gears • Pinions • Rolls • Wheels
and Other Hardened Products

The edges of U. S. Giant Underground Belt are reinforced against wear!



Many times the belts on standard underground equipment are subjected to severe edge wear. When worn down to the fabric, moisture and fine coal get in and wreck the belt.

This doesn't happen with the new U.S. Giant® Underground Conveyor Belt. It has a *rubber capping on the edges*—effectively prolonging service life.

Because you want long life and economy in your coal haulage belts, your best bet is to buy "U.S." There are 25 District Sales Offices, staffed with belt engineers to serve you.

TRANSFER POINT between two 30" 4-Ply Style XN U.S. Giant Conveyor Belts. Style XN is a patented construction of cotton and Nylon carcass embodying greater strength, crosswise flexibility and has greater fastener-holding ability. Mildew-resistant, and does not absorb water. Weighs less than conventional type belts. Many thousands of feet of this belting are operating in this mine.

U.S.RUBBER
SERVING THROUGH SCIENCE

"U.S." Research perfects it
"U.S." Production builds it
U.S. Industry depends on it

UNITED STATES RUBBER COMPANY
MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting

Low-cost transportation since 1928!

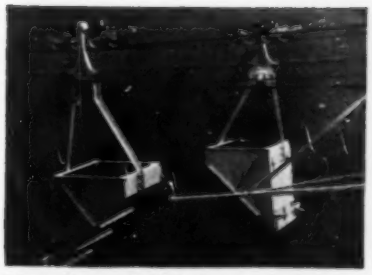
Tasa Coal Company Morgantown, West Va.

This 3,412-foot bicable tramway has been in continual operation for more than 25 years. It carries 200 tons of coal per hour at low ton-mile cost, giving dependable all-weather service.

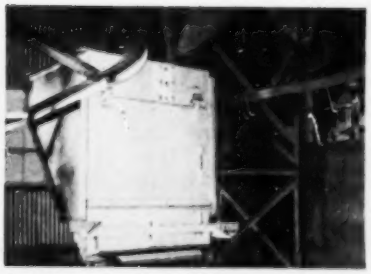
It spans a river in one 1500-ft. jump, crosses a public highway and a high tension line on the way from loading terminal to discharge hopper.

The 62 cu. ft. end-dump buckets load and unload automatically... discharging into a terminal bin at the rate of one every 26 seconds.

This aerial tramway was designed by the Tramway Division of United States Steel. The job included designing and furnishing cables, mechanical buckets, electrical equipment—and supplying all of the steel required.



Conveying materials for a few hundred feet or for several miles, Columbia-Geneva Tramways can be built to handle from 1½ to more than 300 tons hourly. They can be designed to meet almost every type of operating condition, and to handle many kinds of commodities easily and economically—from a tray of optical lenses to a carload of lumber.



Load carriers, like this one on a bicable tramway, are available in many different types and sizes. Services of Columbia-Geneva's Tramway Division include designing the tramway...supplying the steel...excavating for foundations and erecting support structures...furnishing and installing all wire rope, cables, and electrical and mechanical parts.

Tramway support structures are of many types, depending on terrain and job. Because of this flexibility, tramways are free of ground contour, roads, railroads, etc., are unhampered by bad weather, and can climb extremely steep grades. Other advantages: loads can be moved without rehandling and rights-of-way are easier to acquire.

Send for this free manual on aerial tramways. Write on your letterhead today to the Tramway Division, Columbia-Geneva Steel, 141 Battery St., San Francisco 6, Calif. Or for an expert study of your transportation needs, ask for the services of a Tramway Engineer. He can show how an aerial tramway would pay off for you, and he can contract for its design and all phases of its construction, including materials.

Tramway Division

Columbia-Geneva Steel

Division United States Steel Corporation, San Francisco

UNITED STATES STEEL

In hand hoists—
It's Coffing

OVER 80 SIZES AND MODELS TO FILL ALL YOUR NEEDS

SPUR-GEAR HOISTS
22 models — ¼- to 25-ton

SAFETY-PULL RATCHET LEVER HOISTS
10 roller-chain models — 1,500- to 30,000-lb.
2 coil-chain models — 1,500- and 3,000-lb.

CHALLENGER LIGHTWEIGHT ALL-STEEL SPUR-GEAR HOISTS
3 models — ½-, 1-, and 2-ton

MIGHTY-MIDGET PULLERS
2 sizes—500- and 1,000-lb.

HOIST-ALLS two sizes — 1-, and 2-ton capacities

also:

EXTENDED HAND WHEEL HOISTS
6 models — ¼- to 3-ton

ARMY-TYPE HOISTS
(plain and geared)
11 models — ¼- to 10-ton

LOW HEADROOM HOISTS
12 models — 1½- to 24-ton

CLEVIS-CONNECTED HOISTS
11 models — ¼- to 10-ton

DIFFERENTIAL CHAIN HOISTS
2 sizes — ½- and 1-ton

HOIST BINDER
3,000-lb. capacity

Ask for more information on the units you need from the most complete line of hand-operated hoists. Write Dept. G7.

COFFING HOIST COMPANY
DANVILLE, ILLINOIS

Coal Company Earning Reports

Peabody Coal Co. and subsidiaries—Fiscal year to April 30, 1953: net profit of $700,972 on sales of $40,459,013; compared with a net of $1,557,476 on sales of $49,496,703 in the previous fiscal year.

Truax-Traer Coal Co. and subsidiaries—Fiscal year ending April 30, 1953: net income of $2,802,377, or $2.21 per common share, on net sales of $52,710,722; compared to a net of $3,346,838, or $2.95 a share, on sales of $60,285,431 in the previous year. Approximately 25¢ of the difference in earnings per share for the 2 yr was a result of an increase in preferred dividend requirements during the 1953 fiscal year.

Ziegler Coal & Coke Co.—1952 net income of $934,692, or $2.36 a common share; compared with a net of $1,112,711, or $3.53 a share, in 1951.

St. Lawrence Hearings End

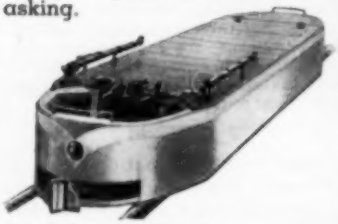
Hearings before the House Public Works Committee on the St. Lawrence Seaway and Power Project ended June 18 with Tom Pickett, executive vice president of the NCA acting as chief spokesman for the opposition. Mr. Pickett said the Seaway would be a "fiscal indiscretion" for the country and was neither desirable or essential. Earlier, it was reported that the bill had been taken off the "must" list and probably would not be acted on during this session.

YOU'LL DO BETTER *with* DIFFERENTIAL

THE COMPLETE MINE HAULAGE SYSTEM

Examine the facts and, chances are, you'll specify Differential.

Every type of mine hauling equipment—locomotives, mine cars, rotary dumpers, mine supply cars, air dump cars, rock larries, ballast cars, mantrip cars—can be supplied. Our engineering and sales counsel are available to you without charge—yours for the asking.



Only Differential offers the complete mine haulage system.

Rotary Dumper

Mantrip Cars

Mine Supply Cars

Large-Capacity Mine Cars

DIFFERENTIAL STEEL CAR COMPANY
FINDLAY, OHIO

SINCE 1915—PIONEERS IN HAULAGE EQUIPMENT

strip MORE overburden for LESS cost

with the BIG RED TEAM

BUCYRUS-ERIE SCRAPER and INTERNATIONAL TD-24 TRACTOR

haul bigger payloads "Boiling-action" loading of Bucyrus-Erie scrapers directs dirt to center of bowl, breaks up chunks to eliminate voids and assures a full and compact load.

make more trips per day You get greater hauling speed and easier, faster maneuverability from features like these: gooseneck design for short turning radius . . . big tires for extra flotation . . . low center of gravity for increased stability on rough and uneven terrain.

dump fast and clean . . . because positive rolling ejection requires less power and lets you dump in higher tractor gear for quicker action on spot dumps or spreading. Apron is adjustable to secure best dumping of any material.

more working time . . . because the Big Red Team needs less service and maintenance. Lube points are easy to see, easy to get at . . . sealed wheel bearings extend greasing intervals to 500 hours . . . cable lasts longer — doesn't require frequent replacement.

BUCYRUS-ERIE COMPANY
South Milwaukee, Wis.

29T53C

BUCYRUS ERIE

Find out more about these B-type Bucyrus-Erie scrapers . . . . . .

MODEL	CAPACITY STRUCK	CAPACITY HEAPED
B-250	25 cu. yd.	27½ cu. yd.
B-170A	16 cu. yd.	21 cu. yd.
B-115	10 cu. yd.	14 cu. yd.

See Your INTERNATIONAL Industrial Tractor Distributor

"W" DENTED SHAKER SCREENS

A "must" when it comes to obtaining an efficient job! *Good* because the spreading and collecting riffles give uniform spread of material over the entire screen surface . . turns the top and middle flow of material down in direct contact with the screen . . . gives an increased screening efficiency up to 33% on fine sizes over an undented flat screen.

Comes in Carbon and Stainless Steels and Manganese Bronze. No sag.

Write us today. We shall reply promptly.

REMALY
MANUFACTURING CO., INC.
TAMAQUA, PA.

Among the Manufacturers

General Electric Co. has appointed C. R. Stouch manager of the Charleston, W. Va., apparatus sales office, succeeding E. G. S. Maxwell who has moved to Philadelphia as manager, apparatus product sales for the Atlantic Dist. Mr. Stouch has been in the Charleston office since 1928, most recently as a sales engineer.

International Harvester Co., Chicago 1, has elected Harold T. Reishus, general manager, Industrial Power Div. since its formation in 1944, to vice president in charge of the division. Joining the company in 1923, Mr. Reishus advanced through various managerial positions, formerly serving as eastern regional manager of general sales and assistant domestic sales manager of industrial equipment.

Fruehauf Trailer Co. has named Robert E. Baxter truck bodies and special equipment sales manager. Mr. Baxter was vice president and general manager of the Syracuse, N. Y., headquarters of National Automotive Parts Association prior to joining Fruehauf.

A. R. Long, 80, founder of Long Super Mine Car Co., Inc., Oak Hill, W. Va. in 1937, and a prominent designer of mechanized coal equipment, died May 1 at St. Francis Hospital, Miami Beach, Fla., where he was vacationing. A graduate of University of Kentucky, where he studied engineering, he was closely associated with the development of western Kentucky coal fields, managing properties for the Ohio River Coal & Transportation Co., and later the Pittsburgh Coal Co. He was superintendent of the Fayette County, W. Va., mines of the firm of Scarbro & Summerlee for 11 yr. His son, John B. Long, is president of Long Super Mine Car Co.

E. J. Longyear Co., Minneapolis 2, has named Eugene Larson sales manager, heading all sales and promotion activities. In making the announcement, Robert D. Longyear, president, said: "Present lines of equipment and professional engineering services will be expanded and extensive plans for concentrated coverage in the United States, Canada and throughout the world are now under way."

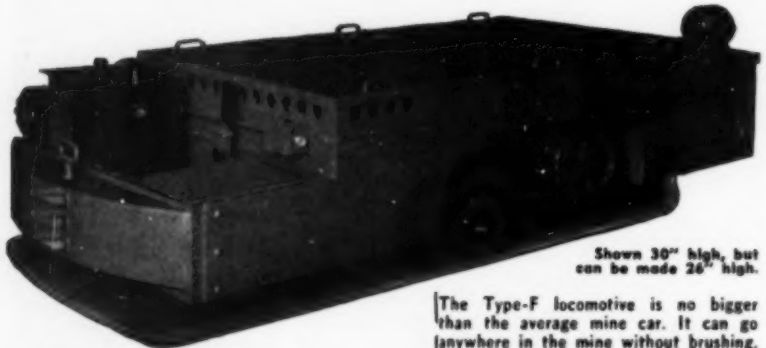
R. G. LeTourneau, Inc., has announced that its headquarters, formerly located in Peoria, Ill., have been transferred to Longview, Texas.

Industrial Power Components Div., General Electric Co., Schenectady, N. Y., has appointed Thorn L. Mayes, general manager of the newly created Small Integral Motor Dept., responsible for standard and derivative lines of polyphase induction motors from 1 to 5 hp, transferring the small integral motor business from the G-E Motor and Generator Div. The operations will remain at Lynn, Mass., until the fall of 1953 when they will be relocated in Ft. Wayne, Ind. Mr. Mayes, manager of engineering, Lynn, Mass., motor factory before going to Ft. Wayne last year, came to GE in 1927. Another GE department transfer plan has been announced. The welding department, located in Fitchburg, Mass., since 1946, will be transferred to York, Pa., by the end of March, 1954, to enable the welding department, and the small turbine and supercharger department, which will remain in Fitchburg, to expand and provide room for predicted increases in the business of both departments. The York plant formerly housed GE's Wire and Cable Div., which is being moved to two New England cities.

Firth Sterling, Inc., Pittsburgh 30, has established a new Chicago district office and warehouse, at 3415 North Ave., Melrose Park, Ill., to provide increased facilities for stocking standard Firthite carbide products, and high-speed tool and die steels. R. O. Valoon, with Firth Sterling for 19 yr, has been appointed district manager of the Chicago district, succeeding E. A. Carpenter, who has resigned to establish his own business. Lester N. Shannon Jr. has been appointed district manager of the company's Southern District with headquarters in Birmingham, succeeding C. E. Hughes, resigned. Stuart A. Smith has been named Ohio district manager, replacing Macon Jordan, resigned. James E. Gray has been appointed assistant manager of

FOR DEPENDABLE GATHERING and MAIN HAUL SERVICE IN SMALL MINES

ATLAS 3-TON TYPE F



Shown 30" high, but can be made 26" high.

The Type-F locomotive is no bigger than the average mine car. It can go anywhere in the mine without brushing. Built like a big trolley locomotive with two motors, one driving each axle. Users say they are the best in the world.

- Low Maintenance!
- Unequalled Performance!

THE ATLAS CAR & MFG. CO.
ENGINEERS MANUFACTURERS
1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

Big Red TD 24 Rips the Shale

RUSSELL CARROLL KNOWS Big Red is doing a dependable job: *"Our TD-24 moved in and has been on the job continuously, clearing the strip."*

International Power Works 10 Tough Hours a Day for V.H. Carroll Construction Company of Canton, Illinois

A 5½-foot vein of No. 5 coal is worth stripping, even if you have to gouge down 50 feet for it. But it takes strong, tough equipment to do it.

For V. H. Carroll Construction Company, Canton, Illinois, that means Big Red, the rugged TD-24—to rip up the shale and shove it over to the spoil piles, or scrape it into heaps for the dragline bucket.

The versatile TD-24 also clears land for the dragline, pushes trucks, levels spoil piles, and cleans up after the stripping. Big Red plays a big part in this 500-ton-a-day job. Russell Carroll puts it this way: *"It takes a powerful tractor to cut thru' this shale, rip it out, then push a big load to the spoil pile. Our TD-24 sure is doing a swell job for me."*

See your International Industrial Distributor for on-the-job proof of top performance and day-after-day endurance. Find out about his full stock of parts, his factory-trained mechanics. You'll be a TD-24 man from there on in!

INTERNATIONAL HARVESTER COMPANY
CHICAGO 1, ILLINOIS

INTERNATIONAL POWER THAT PAYS

For VERTICAL or *ANGLE* bolting

Republic

MINE ROOF BOLTS

Republic makes two types of roof bolts for either vertical or angle roof bolting. Each type has its proper application depending on the roof strata encountered.

Available with either slotted or threaded ends, Republic Roof Bolts feature all the qualities of the Upson Line of headed and threaded products. Shanks are sturdy and tough . . . threads are clean, sharp and accurate . . . heads are square-faced for snug wrenching.

Shank lengths are available in sizes from 18 inches to 90 inches . . . special lengths on request. Write us for additional information on Republic Mine Roof Bolts.

REPUBLIC ROOF BOLT—*A ¾-inch rolled-thread bolt with square-head and forged washer for additional bearing surface. May be used in combination with roof channels, roof ties, roof plates or angle washers.*

REPUBLIC SLOTTED ROOF ROD—*A one-inch rolled-thread rod with slotted end to take wedge. Furnished with hex or square nuts and various size roof plates.*

REPUBLIC STEEL CORPORATION

Bolt and Nut Division • CLEVELAND 13, OHIO

Export Department: Chrysler Building, New York 17, N.Y.

REPUBLIC *Upson Quality* **BOLTS AND NUTS**

Other Republic Products Include Machine, Tank and Carriage Bolts • Lag and Cap Screws • Track Bolts and Spikes • Pipe, Sheets and Wire

carbide sales. Mr. Gray joined Firth Sterling in 1929 and was Supervisor of Carbide Sales in the Chicago District until his recent appointment.

Westinghouse Electric Corp. has integrated into a northeastern region the New England and Eastern apparatus sales district. The Eastern district, headquartered at New York, includes all of New York State and parts of Pennsylvania and New Jersey. The New England district maintains headquarters at Boston. Robin S. Kersh is manager of the new district in addition to his regional responsibility as manager of the Eastern District. Edward C. Delano will remain as manager of the New England District.

All outstanding capital stock of Roberts & Schaefer Co., Chicago, has been acquired for cash by a newly chartered firm, Roberts & Schaefer Co. (Delaware), representing interests of J. M. Doroshaw, of New York, and Louis Goldsmith and Joseph Karp, of Cincinnati, it was announced last month. Under the new ownership operational policy of the 50-yr-old firm will remain unchanged, with John E. Kalinka, associated with the company for 28 yr, becoming chairman of the board and chief executive officer. Frank E. Mueller, identified with R&S since its inception, will continue as president and director through next year, when he will have completed 50 yr of service with the company. Robert E. Sloan, secretary-treasurer, has been promoted to the additional post of executive vice president, succeeding Mr. Kalinka.

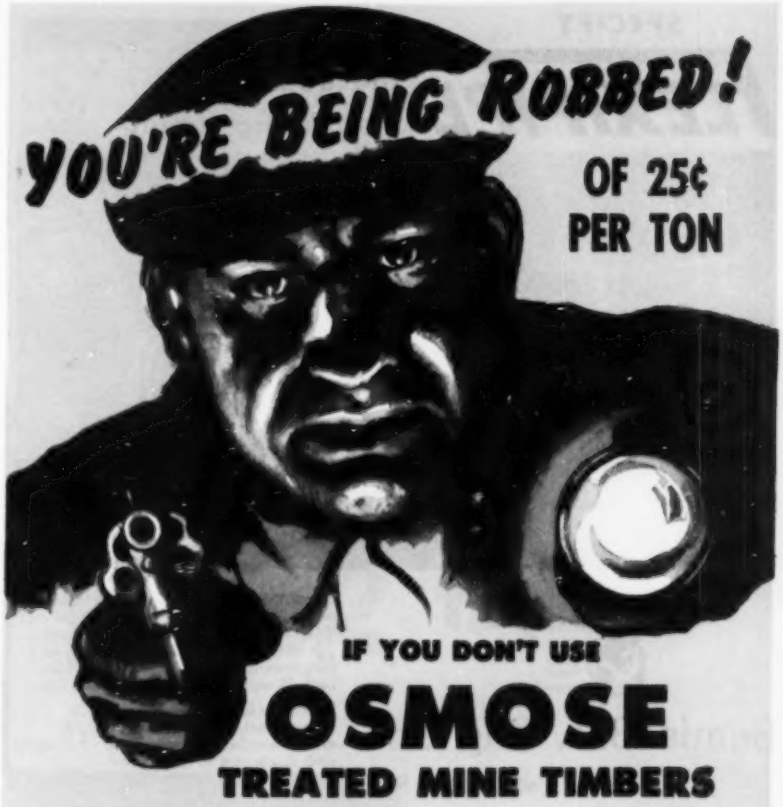
McNally Pittsburg Mfg. Corp., Pittsburg, Kan., has named George Burke, Ashland, Ky., to head its sales service and engineering in the West Virginia and eastern Kentucky coal area. Mr. Burke will work out of the McNally Pittsburg office at Wellston, Ohio., but will continue to reside in Ashland.

Air Reduction Sales Co., New York 17, has appointed E. C. Clark, since 1949 assistant director, research and engineering department, director of operations.

Thor Power Tool Co., Aurora, Ill., has elected four new vice presidents. J. A. Hill, with the organization 33 yr, was elected vice president and sales manager. John A. McGuire, chairman of the executive committee, in addition becomes vice president in charge of labor relations. B. H. Johns, with the firm 27 yr, was named vice president in charge of rock-drill sales. W. B. Hunn with Thor 18 yr, was elected vice president in charge of the company's Los Angeles works.

Sintering Machinery Corp., in expanding sales representation of its Transportometer Div., has appointed the following additional sales representatives: Tate & Roe Co., 5542 Dyer St., Dallas, Texas, for the territory including Texas, Oklahoma and northwest Louisiana; The Gallgher Co., Salt Lake City 4, for the territory including Utah and neighboring areas in Nevada, Idaho, Montana and Wyoming.

Link-Belt Co. has appointed Harvey V.



If you use untreated mine timbers, *you* are being "held up," *not* the roof. You're the victim, because they are robbing you of as much as 25¢ profit on every ton you mine. 40% to 60% of your supply bill is for timber and timber replacement. We can CUT both of these costs by making mine timbers LAST LONGER.

3 DIFFERENT WAYS TO SAVE

1 We can furnish you with OSMOSE TREATED TIMBERS
We can supply you with Osmose-treated square-sawed, slabbed or round timbers, ties, collars, posts, lagging, caps, wedges or tipple timbers from one of our treating plants. These select Osmose-treated timbers will render many years of EXTRA service.

2 We will CUSTOM-TREAT timbers furnished by you
We will Osmose-treat your own timber at our nearest treating plant. Remember, this treatment can be applied to ANY wood species, even beech, gum, hickory, ash, elm and maple.

3 We will furnish materials and you can treat your own timber By constructing an inexpensive vat and following directions, you can treat your own green timber with OSMOSALTS.

Osmose Treated Mine Timbers are scientifically processed to resist decay and all wood destroying insects, and they last 3 to 5 times longer. With Osmose treatment ANY wood species, even beech, gum, hickory, ash, elm and maple, can be converted into *long lasting timbers!*

Write for Free Literature and details on the type of Osmose service you prefer (see classifications at left).

OSMOSE WOOD PRESERVING COMPANY OF AMERICA, INC.
980 ELLICOTT STREET • BUFFALO 9, N. Y.
Representatives in Pittsburgh, Denver, Birmingham, Ala., Charleston, W. Va. and Harlan, Ky.

SPECIFY

FLEXIPIPE® the quality ventilating tubing

Flexipipe is now available with Rope Seam Suspension *at no additional cost.* The newest, best, quickest suspension . . . eliminates special accessories and suspension wires . . . *all you need is a nail.* It equalizes strain on the tubing.

Flexipipe is efficient, serviceable, economical. Jute and heavy-duty grades available in a variety of lengths and diameters to meet your requirements.

Write for complete information and sample.

Bemis Bro. Bag Co.

408-O Pine St.,
St. Louis 2, Mo.

4 STAR TIMER

★ Low in Cost
★ No false contacts
★ No chatter
★ Quiet in operation

HYDROGEN SEALED

Durakool
STEEL MERCURY TIMERS

The steel-clad factory set Durakool timer-relay operates in "sealed in" hydrogen under pressure, with mercury to mercury contacts. Timing is temperproof. Non-breakable and built for millions of contacts. Fixed time delays available from 1/6 to 20 seconds, either normally open or normally closed action.

See Telephone Directory for Local Distributor or write Durakool, Inc. Elkhart, Indiana Send for Bulletin 800
50 St. Clair Ave., W. Toronto

Eastling assistant general manager, Pacific Div., with headquarters at San Francisco. Formerly general sales manager for the division, he joined the company in 1925. Donald E. Thal has been named sales manager of the San Francisco plant. With the company since 1935, he had been assistant sales manager at San Francisco.

Frank G. Hough Co., Libertyville, Ill., has appointed Kenneth B. Larkin district representative for the sales territory comprising Washington, Oregon, Idaho, Montana and the Canadian provinces of British Columbia, Alberta and Saskatchewan. He succeeds H. E. Thomas, named district representative for the territory of Illinois, Michigan, Indiana, Ohio, Kentucky and eastern Missouri. Mr. Larkin had been associated with Nelson Equipment Co., Hough distributor in the northwest.

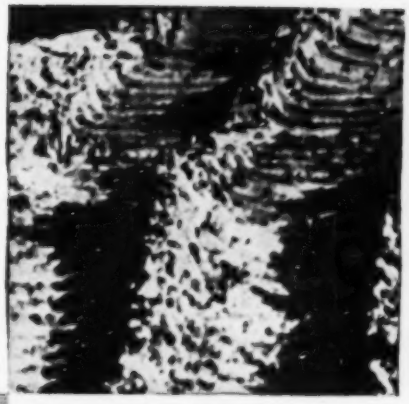
Colorado Fuel & Iron Corp. has opened a new warehouse and sales center for steel products, chemicals and fuel in Wichita, Kan., to serve the expanding industries of Oklahoma, Nebraska, Missouri and Kansas. Occupying 30,000 sq ft of floor space, it will be the sales-distribution point for the products of CF&I's eastern and western plants. Sales offices occupy 2,000 sq ft of the floor area, and will handle distribution of coal, coke and various chemicals, including benzol, naphthalene, creosote and fertilizer, as well as steel and wire products.

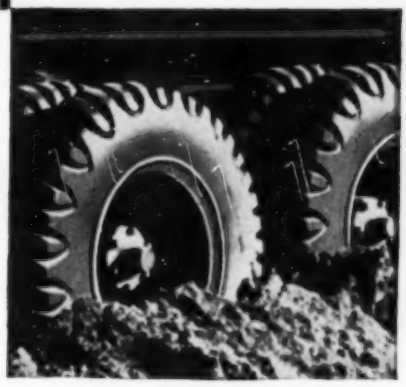
Rollway Bearing Co., Syracuse, N. Y., has elected John D. Williams vice president and general manager succeeding William B. Smithers, who recently resigned. Mr. Williams also holds the same positions in Lipe-Rollway Corp., which owns 100% stock interest in Rollway.

Bucyrus-Erie Co. and International Harvester Co. have announced an arrangement whereby Bucyrus-Erie industrial tractor equipment will be sold, distributed and serviced by Harvester to its industrial-power distributors and eventually will be manufactured by Harvester. In the past, Bucyrus-Erie has manufactured equipment for Harvester's industrial tractors, bulldozers and scrapers, selling direct to Harvester distributors. However, Bucyrus-Erie has need for additional facilities to manufacture products other than tractor equipment, and will withdraw eventually from the manufacture of such Harvester equipment. Bucyrus-Erie will continue to supply Harvester distributors directly with allied tractor equipment until Jan. 1, 1954. After that date, Harvester will take over the sale, distribution and servicing of Bucyrus-Erie tractor equipment, purchasing its requirements from Bucyrus-Erie up to the limits of that company's present tractor equipment capacity, reselling to Harvester distributors, until Bucyrus-Erie discontinues manufacture of its present line of tractor equipment and Harvester takes over their manufacture.

Metal Carbides Corp., Youngstown, Ohio, has opened a sales office at 325 Bankers Trust Bldg., Indianapolis, Ind., headed by Frank C. Thompson Jr., resident sales engineer.

THE TRACK OF A Mack TELLS A STORY OF Power





Ever notice the ground where a Mack six-wheeled truck has passed over? No scuff marks here. The track of a Mack tells a story of unfaltering traction . . . of surefooted, relentless driving power.

The "reason why" is found in Mack's Balanced Bogie with exclusive inter-axle and inter-wheel Power Dividers that assure positive traction under the most adverse conditions. Acting normally as a true differential, the Power Divider delivers torque between the bogie axles and wheels in proportion to wheel traction, thus eliminating useless wheel slippage and spinning.

Your nearest Mack branch or distributor will show you how Mack six-wheelers can keep your big loads moving fast—no matter how tough the terrain—on dependable, time-saving, cost-cutting schedules.

Mack TRUCKS

1726

. . . Outearn Them All

Mack Trucks, Empire State Building, New York 1, N. Y. Factory brunches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

COAL MEN ON THE JOB . . .

SYCAMORE COAL CO., Cinderella, W. Va. (left photo)—W. B. Mottesheard (left), assistant mining engineer; and Tony Politino, rodman.

RED JACKET COAL CORP., Junior mine, Red Jacket, W. Va. (right photo)—A. A. Mankin (left), general assistant mine foreman; Ty Hammond, day general mine foreman; Lewis Simpkins, night general mine foreman; Frank Davis, assistant superintendent; and Dan Hammond, general assistant mine foreman.

State Equipment Co., Harrisburg, Pa., has advanced Robert F. Chidsey to sales representative servicing users of heavy construction equipment in the Pennsylvania counties of Dauphin, Cumberland and Perry. He was for 3 yr assistant manager for the firm.

Warren Steam Pump, Inc., Warren, Mass., has appointed Meters & Controls, Inc., 444 N. LaSalle St., Chicago 10, as its sales representative for the northern half of Illinois, the lake counties of Indiana and the river counties of Iowa.

Preco, Inc., Los Angeles, has appointed Gerald L. Duffy district representative for the eastern United States and Can-

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A HEALING HAND...

AUTHORIZED AIRCO DEALER

ONE call
ONE order
ONE invoice
For every welding and cutting need!

TAKE TORCHES AND REGULATORS, FOR INSTANCE . . . Your authorized Airco dealer maintains a full supply of moderately priced outfits for welding . . . brazing . . . heating . . . cutting . . . or soldering. If no standard set-up meets your particular requirements, he can recommend the proper combination of units — and assemble your special-purpose outfit from stock.

Every item is backed by the AIRCO reputation . . . and delivered promptly to your door!

Whether you want to buy . . . or simply seek information, check your Airco dealer first! Consult your classified phone directory (under Welding Equipment and Supplies)...look for the famous sign.

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AIR REDUCTION PACIFIC COMPANY
REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL
Divisions of Air Reduction Company, Incorporated
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AT THE FRONTIERS OF PROGRESS YOU'LL FIND AIR REDUCTION

NEED TE*?

—YOU GET PLENTY WITH

KERSEY

BATTERY— POWERED HAULAGE EQUIPMENT

- Model 444 4-Wheel-Drive 4-Wheel-Steer Tractor.
- Model LCM Locomotive— Heights 20″ Up, All Gauges.
- Model Tug Tricycle Tractor.
- Coal and Supply Trailers.
- Battery Charging Equipment.
- Special Haulage Vehicles.

KERSEY MFG. CO.

P. O. Box 150
Phone 4228
Bluefield, Virginia

(*TE-TRACTIVE EFFORT)

SUPERLA
REG. U. S. PAT. OFF.
Mine Lubricants

One for all...

More and more midwest mines are realizing important savings through the versatility of SUPERLA Mine Lubricants. Inventories have been simplified and over-all lubrication costs reduced.

In one mine, a SUPERLA Mine Lubricant was adopted for use in main transmissions and gathering heads of Joy loaders and in the wheel bearings of coal cars as well. In over three years' operation, there has been no downtime because of scored clutch plates or faulty lubrication. In the cars, leakage of lubricant from bearing housings has been eliminated.

Also in this mine, a SUPERLA Mine Lubricant has provided trouble-free lubrication in the transmissions of Goodman loaders and in the gear cases of cutting machines. In more than three years of operation, there have been no cases of downtime of loaders or cutters due to faulty lubrication. Warm-up time for the loaders has been eliminated.

These are the big jobs, but the versatility of SUPERLA Mine Lubricants covers a wide range of applications from motor armature bearings to loading machine hydraulics. The chances are you can replace several special-purpose lubricants with one or two SUPERLA Mine Lubricants and get better lubrication results in each case. There's a Standard Oil lubrication specialist located near you who knows mining equipment and who will work closely with you. To reach him, you need only call your local Standard Oil office, or write: Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

STANDARD OIL COMPANY STANDARD *(Indiana)*

"THIS LUBRICANT CUT OVERHAULS IN HALF"

—says WESTERN AUTO TRANSPORTS, INC.

"Operating over 200 tractors and 200 trailers from Detroit to the West Coast, we encounter temperatures from 120° above across the desert to 40° below in the mountains of Colorado. We have found that with LUBRIPLATE our wheel bearing packing mileage has tripled. Since using Lubriplate A.P.G.-90 in our transmissions and differentials, we are getting double the mileage between their overhauls."

For nearest LUBRIPLATE distributor, see Classified Telephone Directory. Send for free 56-page "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

ada, with headquarters at Harwich, Mass.

Westinghouse Electric Corp. has nearly doubled its capacity for the production of generators and large motors, it recently reported. In addition, an expansion program now being completed at the Transportation and Generator Div. at the East Pittsburgh, Pa., works also provides for future expansion as needed. The continuing growth of the electric utility industry has called for increased production of generating apparatus, both in numbers of units and in unit sizes. The trend clearly indicated the need for enlarged production facilities, and the expansion program was launched in 1950. Heart of the expansion is a new 100,000-sq ft building that parallels the previous manufacturing aisle. Turbine generators up to about 60,000 kw will continue to be built and tested in the former manufacturing areas. Larger machines, and waterwheel generators, will be machined in the former areas, but will be assembled, wound, and tested in the new building. Coupled to the construction of the new manufacturing building have been numerous changes in the machining and fabricating sections that will feed the assembly areas.

Rapidly increasing demand for Edison nickel-iron-alkaline storage batteries in the mining industries has been a major factor leading to new plans for plant expansion and increased production of batteries, it was announced recently by George E. Stringfellow, senior vice president of Thomas A. Edison, Inc., and general manager of the Edison Storage Battery Div. Expansion plans call for a 40% increase in battery production capacity at the West Orange, N. J., plant, at an estimated cost of $6,000,000. The plant enlargement will be the second major extension that Edison has undertaken in 4 yr to increase its manufacturing capacity. A program started in 1948 stepped up production of nickel-iron-alkaline storage batteries by 25%.

Plans for construction of a new plant, at a location yet to be determined, were announced last month by Louis B. Neumiller, president, Caterpillar Tractor Co. The new plant, occupying 700,000 sq ft of manufacturing floor space, will be devoted to the production of the company's line of motor graders and industrial wheel tractors, in a move to accommodate at Peoria a broadened program of crawler-tractor and diesel-engine manufacture. This enlargement and rearrangement of manufacturing facilities and the construction of the new plant are expected to be completed by the end of 1955. The total cost of new machinery and equipment at all plants and of land and buildings at the new plant is estimated to be approximately $45,000,000.

Westinghouse Electric Corp. last month broke ground for a new modern Research Center. Dr. John A. Hutcheson, Westinghouse vice president and director of research, turned the first shovelful of earth at a ceremony held on a 70-acre plot about 10 mi east of downtown Pittsburgh's Golden Triangle. "When these new research facilities are completed early in 1955," Dr. Hutcheson said, "we

U.S. PATENT No. 3548399 — OTHERS PENDING

HERE'S WHY!

- **No chains, sprockets, sheaves, out in the weather and dirt!**
- **No chain idlers to keep adjusted or oiled!**
- **No V-belts to be continually checked, adjusted and replaced!**
- **No shafts and drives to service and lubricate!**
- **No motors exposed to damage or weather!**

***Everything* CONTAINED within the pulley!**

IT'S *motorized* to eliminate expensive upkeep and cut downtime to the barest minimum on all belt conveyor or belt-bucket elevator operations. *All moving parts are inside the pulley,* enclosed and protected by the pulley shell from weather, dirt and damage. Operation is simple... the pulley shell rotates around the electric motor and reduction gears, which are held stationary by a torque arm attached to conveyor frame. Compact, easy to install, *economical* . . . get complete details from your nearest distributor, or write for Bulletin MP-1 today!

Built for sale in Arizona, California, Nevada, New Mexico, Southern Oregon, Southwestern Utah and Texas by

YUBA MANUFACTURING CO.
(Pulley and Sprocket Department)
Benicia, California

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MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

Make Your Own Hose Lines

AEROQUIP HOSE AND FITTINGS ARE MATCHED FOR GUARANTEED PERFORMANCE

No skill or special training is required to assemble Aeroquip Flexible Hose Lines by hand *in a matter of minutes!* YOU CUT COSTS because Aeroquip fittings are detachable and may be used again and again. YOU REDUCE INVENTORY because with Aeroquip bulk hose and a few fittings you can fill practically all your hose line requirements. YOU REDUCE DOWNTIME because with Aeroquip on hand, quick hose line replacements are available at all times.

Cut hose to length with hacksaw; screw into socket.

Oil nipple and inside of hose liberally.

Screw nipple into socket and hose.

Install fitting on other end; hose line is ready for use.

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AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

there is NO substitute . . .

MPC WOOD-LINED PIPE MEETS ALL THE REQUIREMENTS FOR A DEPENDABLE MINE PIPE

COMBINES THE STRENGTH OF STEEL WITH THE DURABILITY OF WOOD

MPC Wood-Lined Steel pipe is ideally suited for acid mine waters, culm, and slurries to pressures up to 400 psi. The wood lining, made of clear redwood, Douglas fir, or pine staves, is offered in thicknesses from 11/16" through 3", while the outer carbon steel shell is available from 14 gauge through schedule 80 thickness. Flanges, welded to the pipe, carry ratings of 125 lb. upwards, with A.S.M.E. bolt circle or special drilling. Pipe sections 10' and 20' regular lengths or fabricated to suit. Internal diameters 4" through 48". Pipe exteriors protected against corrosion. Wood-lined fittings available for all diameters in standard and special designs.

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COAL MEN ON THE JOB . . .

WEST VIRGINIA: C. H. Valentine (left), second-shift foreman, preparation plant, Lady Dunn Mine No. 100, Cannelton Coal & Coke Co., Cannelton, W. Va.; and J. W. Backus, section foreman, Upper Cedar Grove seam, Mine No. 17, Red Jacket Coal Corp., Red Jacket, W. Va.

will have the most modern Research Center in the entire electrical industry." Construction of the Research Center will not only give current company research activities a new home but will also provide the necessary space and flexibility to meet the requirements "placed on us by the expansion program of Westinghouse and by the growing electrical industry," Dr. Hutcheson pointed out. Describing the new center, Dr. Hutcheson said it will be approximately one-third larger than the present laboratories and will provide room for future expansion. In addition to laboratories and offices the structure will house an auditorium capable of seating about 250 persons, a cafeteria of similar size and large technical library, expected to be one of the most complete in the area.

New Books for Coal Men

How Much Oil?

Petroleum in the Western Hemisphere: Report of the Western Hemisphere Oil Study Committee, Independent Petroleum Association of America. Here are the sober facts on oil supply, demand and reserves; their effect on the economy and security of the Western Hemisphere; and the problems the petroleum industry faces in the years ahead. *183 plus viii pp. 6x9-in; cloth. No price quoted. Independent Petroleum Association, 1110 Ring Bldg., Washington 6, D. C.*

Coal and Iron in Asia

Coal and Iron Resources of Asia and the Far East—Report of the United Nations Economic Commission for Asia and the Far East. As an aid to the industrial development of nations in Asia and the

What's overhead won't worry you . . .

YOU'RE SAFE WITH THE

NEW SUPER-TOUGH

WILLSON SAFETY HAT

THE NEW WILLSON SAFETY HAT is entirely new in design, material and method of manufacture . . . tough as metal and more resilient! Here are some other outstanding features of the new Willson Super-Tough* Safety Hat . . .

streamlined contour—deflects objects more effectively and provides a greater safety "pocket" inside.

new suspension design—adjustable "hammock" headband is suspended *inside* at 6 points. No exposed rivets or lacing—no holes through hat.

comfortably cool—space between headband and shell provides ample air circulation for wearer.

moisture resistant—practically 100% waterproof and resists many caustics and acids.

Passes all required tests with an extra margin of safety!

Write for your copy of the new bulletin describing the Willson Super-Tough* Safety Hat.

*trademark

More than 300 safety products carry this famous trademark

WILLSON

Established 1870

WILLSON PRODUCTS, INC.
239 WASHINGTON ST., READING, PA.

Your grinding costs less with Norton wheels

For every grinding job you do, there's a Norton wheel to do it better . . . in less time . . . at lower cost. There's the right combination of abrasive, bond, grain size and structure for each application, above or below the surface. Check here:

SAVE! With Norton ALUNDUM* WHEELS for a wide range of mining needs. For sharpening high-speed steel tools and for grinding other hard, high-tensile-strength materials, they have no equal. Typical specification A30-O5VBE.

SAVE! With Norton regular 37 CRYSTOLON* WHEELS to provide top economy and efficiency for rough grinding gray iron and the nonferrous metals. Typical specification 37C24-Q5V.

SAVE! With Norton green 39 CRYSTOLON WHEELS in the new vitrified K-bond to do the best job sharpening carbide-tipped bits and cutters. Typical specification 39C60-I8VK.

In Norton *Reinforced* Hub wheels — Types BD and BFR — resinoid bonding and nylon web reinforcing assure maximum safety and versatility. On portable grinders their uses include weld grinding and other smoothing operations; also cutting-off and notching.

Your Norton Distributor is ready to help you

Besides his own practical experience with abrasives in the mining field, he can call in the Norton Abrasive Engineer for additional expert aid in your grinding problems. Take advantage of the wide store of knowledge he makes available to you. See him for the right wheels for any grinding job. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

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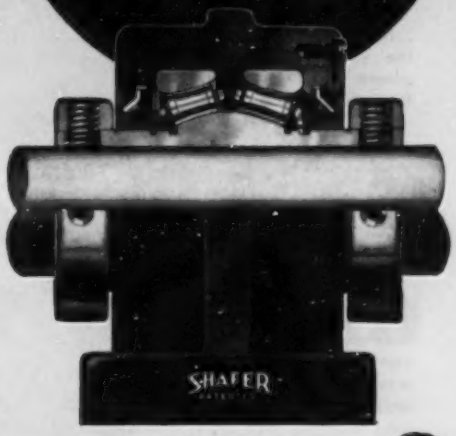
W-1487

NORTON
ABRASIVES
Making better products to make other products better

THE *Rugged* JOBS ARE "*Routine*" FOR SHAFER BEARINGS



Throughout the land Shafer Roller Bearings are increasing the nation's productive capacity—carrying big loads, saving money and power, reducing down time, and maintenance costs wherever America's heaviest duty power transmission equipment is at work.

Shafer Bearings handle these tough jobs better because they are engineered to-the-job—to provide *longer* life, *greater* dependability and *lower* operating costs under the severest working conditions. Integrally self-aligned, they have full radial-thrust and greater reserve shock load capacities under all conditions of misalignment; are equipped with self-centering "Z" housing seals and Micro-Lock 12-point adjustment. See the Shafer bearing specialist near you . . . or write us direct . . . for complete information and engineering consul on a no-obligation basis. SHAFER BEARING CORPORATION, 801 Burlington Avenue, Downers Grove, Illinois.

Pillow Blocks

Flange Units

Flange Cartridge Units

Cartridge Units

Duplex Units

Take-Up Units

Unmounted Bearings

SHAFER
SELF-ALIGNING
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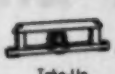
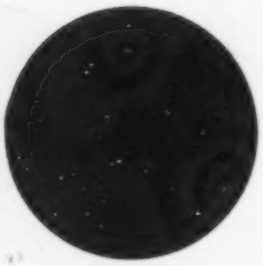

Take-Up and Frame Units

Aircraft Control Bearings

BECAUSE

...shock, abrasive action, rust and corrosion make little headway against all-welded construction of special alloy steel used in Bee-Zee *round rod screens.*



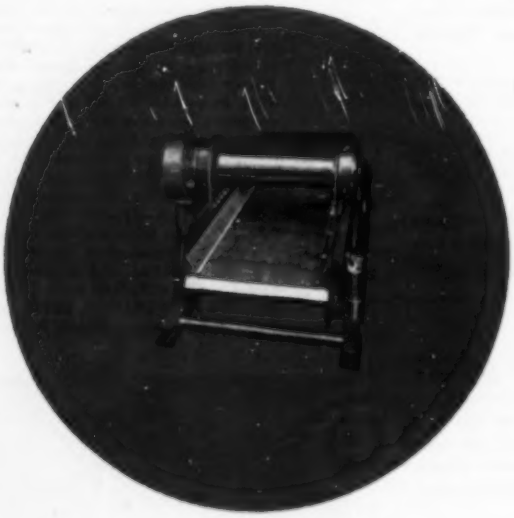
BECAUSE

...tension is built right into the Bee-Zee *round rod* screen to lessen fatigue from stress and strain.

BECAUSE

...Bee-Zee's exclusive *round rod* design can take more punishment... can't blind... maintains screening accuracy to the very end of its life span.

SCREENS THAT "LIVE" LONGER



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BIXBY-ZIMMER *Engineering Co.*

173 Abingdon St., Galesburg, Illinois

BEE-ZEE SCREENS CAN BE FITTED TO ANY SCREENING EQUIPMENT

Far East, the Commission has prepared this study of coal and iron-ore resources. Though handicapped by inadequate data and incomplete surveys and explorations, the Commission concludes that industrialization could advance measurably with proper utilization of known resources, which are described. *155 pp. 8¾x11¾-in; paper. $1.50, Sales & Circulation Section, United Nations, New York.*

Aid to Young Engineers

Engineering—A Creative Profession. This booklet replaces an earlier pamphlet. Designed for youngsters, it tells them what engineering is, what engineers do, what they must know and where they can find engineering schools. *32 pp. 6 x 9-in; paper. 25c per copy; 50 or more copies, 20c each. Engineers' Council for Professional Development, 29-33 West 39th St., New York 18, N. Y.*

Other Books and Booklets

Carbonizing Properties: Tennessee Coals From the Jellico Bed in Campbell County and the Sewanee Bed in Marion County, by D. A. Reynolds, J. D. Davis, G. W. Birge, R. E. Brewer, D. E. Wolfson, W. H. Ode and B. W. Naugle. USBM, Bulletin 523. 35c, Supt. of Documents, Government Printing Office, Washington 25, D. C.

Geology of Anthracite in the Southeastern Part of the Mt. Carmel Quadrangle, Pa., by H. E. Rothrock and H. C. Wagner. Three maps, in color, measuring 38x43 in each, issued together as Map C 12. $1.50 per set, Chief of Distribution, Geological Survey, Washington 25, D. C.

Carbonizing Properties: West Virginia Coals From the Beckley Bed, Caretta No. 5 Mine, McDowell County, and Glen Rogers No. 2 Mine, Wyoming County, by D. A. Reynolds, J. D. Davis, D. E. Wolfson, B. W. Naugle, R. E. Brewer, G. W. Birge and W. H. Frederick, USBM, Bulletin 522. 20c, Supt of Documents, Government Printing Office, Washington 25, D. C.

The following booklets published by the U. S. Bureau of Mines may be obtained free upon request to Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa. All are 8x10¾-in; paper; mimeo.

Estimate of Known Recoverable Reserves of Coking Coal in Wyoming County, W. Va., by J. J. Wallace, J. J. Dowd, W. H. Tavenner, J. M. Provost, R. F. Abernethy and D. A. Reynolds. R. I. 4966.

Use of Torque Wrench to Determine Load in Roof Bolts—Part I, Slotted-Type Bolts, by A. J. Barry, L. A. Panek and J. A. McCormick, R. I. 4967.

Determination of Moisture in Low-Rank Coals, by J. B. Goodman, Manuel Gomez and V. F. Parry. R. I. 4969. 20 pp.

Estimate of Known Recoverable Reserves of Coking Coal in Allegany County, Md., by J. J. Wallace, J. J. Dowd, Lloyd Williams, R. F. Abernethy and D. A. Reynolds. R. I. 4970.

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Your Thermoid Distributor can help you select the belt best suited to your needs. If your problem is unusual, he'll call an experienced Thermoid Sales Engineer.

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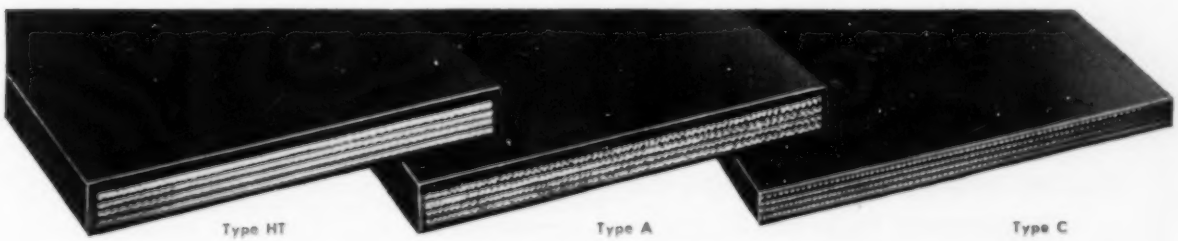

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Heights: 3'-6" to 6'-6" closed; 5'-6" to 9'-6" extended
Weights: 47 to 62 lbs.

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Designed especially for thin, normal and thick seam work in coal mines. Ideal for lifting, moving mine machinery, track work, re-railing locomotives. 5-ton capacities.

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2501 GARDNER ROAD • BROADVIEW, ILLINOIS

W. Va. Mining Institute

Begins on p. 140

steel cable, the machine cuts a 2½-ft slab from the face at a rate of 6 fpm. The British Control Board has ordered a large number of these machines.

Working in a 31-in seam lying on a grade of 1 in 20, and mining along a 106-yd face with men spending 5½ hr at the face per shift, the machine showed an efficiency, at the end of 16 shifts, of 8.1 tons per man. For the second week, the figure was 8.02 tons and for the third, 7.8. For comparison purposes, Mr. Morrow said that 2 tons per man-shift has been considered good performance for English longwall. Dowty hydraulic jacks, which he characterized as the best, together with corrugated bars, are used for roof control.

Mr. Morrow also outlined the development of longwall machines, starting with the Mecco-Moore unit, the first successful one, and then on through the German coal plow, Samson stripper and the latest Dutch machine which, by a series of vibrating cutting shells, shaves off the coal and moves it to the end of the face. Another new machine he mentioned was the Anderson, Boyes "Trepaner," an underground augering machine.

DEGASIFICATION

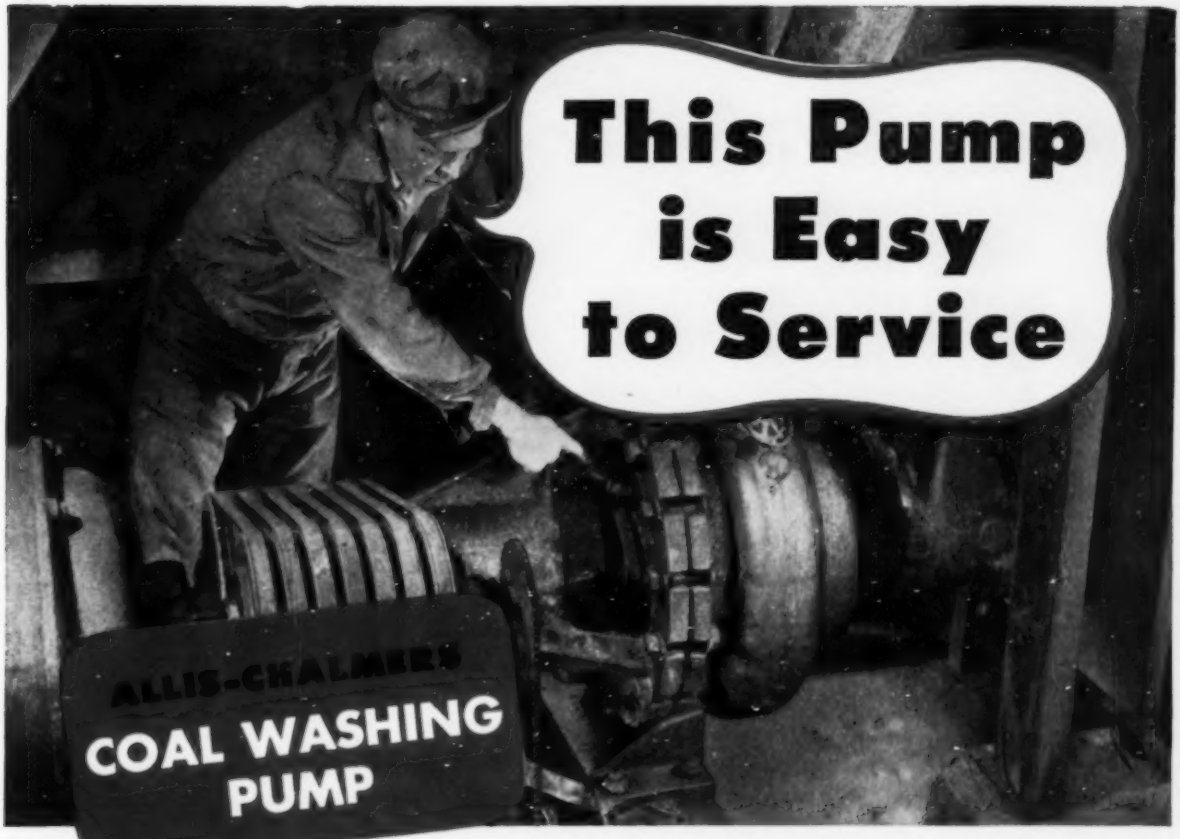
G. R. Spindler, director, School of Mines, West Virginia University, reported on degasification of coal seams. He dwelt principally on a description of experiments that have been underway for about 18 mo in cooperation with the Christopher Coal Co., working with two boreholes from the surface through the Sewickley seam and into the Pittsburgh at a location where advance workings were encountering increasing quantities of methane. His presentation was essentially the same as that given at the AMC Coal Convention in Cleveland (*Coal Age*, June, p 105). In the discussion, W. J. German outlined briefly successful degasification employing vacuum pumps in the Pocahontas field some years ago (*Coal Age*, May 1943, p 87).

THE SAFETY ACT

"I would assert without reservation," said M. J. Ankeny, safety director, Bituminous Coal Operators' Association, "that any operator or any state agency would be most ill-advised to enter into a cooperative agreement as provided for in the Act." This was his conclusion in discussing the state cooperative plan section in his address entitled "An Analysis of Public Law 552." Mr. Ankeny believes the field for cooperation is now wide open without a formalized, complicated contract that would reduce effectiveness and deprive operators of the right to appeal to the director withdrawal orders issued by federal inspectors. Mr. Ankeny's paper covered in considerable detail the administration of the law to date and made recommendations for necessary changes.

COAL AND TAXES

On the problem of "Coal and Taxes," E. L. Snoderly, treasurer, Consolidation



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- **Can be taken down and returned to service in less than a half hour.**
- **Many parts interchangeable between different pump sizes.**

Here's a pump that maintenance men like. The Allis-Chalmers coal washing pump is solidly built to stand rough coal washing service. And it's easy to work on. Notice how accessible the packing gland is. See how the casing bolts are arranged. Just loosen the nuts a couple of turns and the bolts lift out.

Wearing parts separate into easily handled units. In fact, one man can tear down an Allis-Chalmers coal washing pump, replace a part and have it back in action again *in less than a half hour*. Piping need not be disturbed unless the casing is replaced.

COMPLETE PUMPING UNIT FURNISHED

This pump is equipped with *Texrope* V-belt drive and *Vari-Pitch* sheaves. Head and capacity can be varied instantly by the turn of a crank. Allis-Chalmers can furnish the complete pumping unit — pump, motor, control and drive — assembled and ready to run.

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...even longer wear

Impeller and suction wear plate now made of *Ni-Hard* alloy at no extra cost. You get longer wear . . . lower pumping costs.

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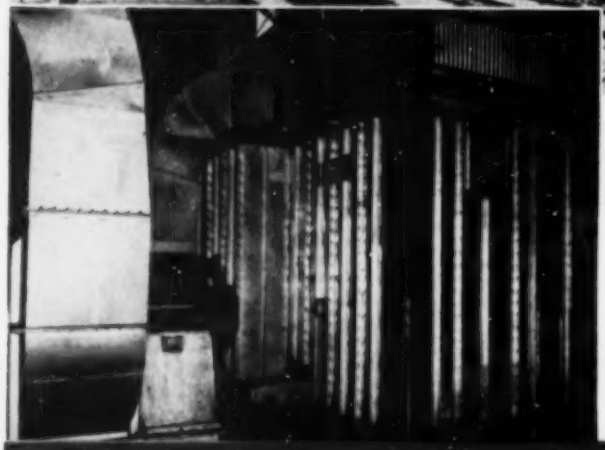

At the Ilmann Plant of Pocahontas Fuel Co., Pocahontas, Va., dust is captured at the air plant (left) in Pangborn Dust Collectors.

Close-up of Pangborn Dust Collector operating within plant.

For more profitable coal preparation

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PANGBORN DUST CONTROL

More mechanization and more production have helped the coal industry meet industry's vastly increased demands over the past decade. But they have created a serious problem for coal processing plants. If *you* face this problem—it will pay you to look to Pangborn Dust Control for the answer!

Pangborn Dust Control traps dust at the source—at tipples, dry cleaning, de-dusting and other operations. And Pangborn Dust Control saves you money, pays for itself by . . . (1) improving the reclamation of valuable dust . . . (2) lowering plant maintenance costs . . . (3) increasing the life of your machines because they operate in a cleaner atmosphere. What's more, higher morale and better health of employees mean increased production.

If you're losing profits because of excessive dust, let Pangborn engineers conduct a free Dust Pocket Survey. It costs you nothing but can mean big savings. Write today for details and your free copy of Bulletin 909A. Just address: PANGBORN CORPORATION, 2800 Pangborn Blvd., Hagerstown, Maryland.

Look to Pangborn for the latest developments in Blast Cleaning and Dust Control equipment

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STOPS THE DUST HOG from stealing profits

COAL MEN ON THE JOB . . .

HENDRIX MINE, Consolidation Coal Co. (Ky.), Deane, Letcher County, Ky.: William Stapleton (top), superintendent, and R. C. Collier, general mine foreman.

Coal Co. (W.Va.), offered this solution, "on the premise that a certain amount of tax is necessary"; be broadminded enough to advocate an equal distribution of the burden to all and to all industries and be willing to spend time and effort to help guide local authorities in spending taxes. His paper concentrated largely on the situation in West Virginia where, in the last few years, the tax burden has shifted largely from the local to the state level.

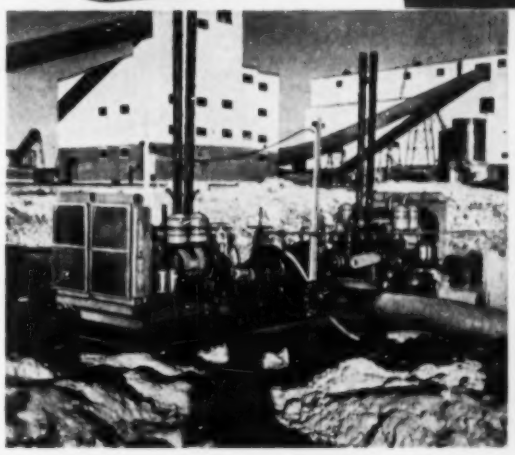
"Would you be willing to serve on your county Board of Education?" This was his challenge in advocating help to local authorities. He asked how the local divisions of authority can be expected to have the same knowledge as the coal industry which has experts in the law, engineering, financing, and accounting branches involved in the tax problem. He said the coal industry should go on the offensive instead of acting defensively only. It should work toward guiding the legislature to a tax program that will give the coal industry some leeway yet enable the state to get enough taxes. The goal should be to protect its interest

GM DIESEL
CASE HISTORY No. 524-1

USER: Barvue Mines, Ltd., Barraute, Quebec. Hydraulic Superintendent, Bert Thomas.

INSTALLATION: Six GM Series 71 Diesel Twins; two drive 2-stage centrifugal pump supplying three 2-inch monitors which jet the water at 125 psi; two on 12-inch pump pumping water from La Flamme River, and two on 12-inch removal pump which sends slurry (25 to 35% solids) to tailing pit.

PERFORMANCE: Company is hydraulic-stripping about 1,000,000 yards of clay overburden for about 35¢ a yard. Barvue Mines estimated $1.25 a yard to strip by ordinary methods.



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Here's a unique application that *proves the profit* of General Motors Diesel power.

Superintendent Thomas reports that the six GM Diesel Twins powering the pumps in this hydraulic stripping operation are on the job 24 hours a day, 7 days a week, except for a 2-hour stop on Saturdays to change oil and filters.

Because of their 2-cycle operation (power at *every* piston downstroke) GM Diesels deliver the steady, uniform power required to keep a steady pressure at the monitors. They burn a minimum of low-cost Diesel fuel. Compactness and light weight make them easy to move. And in remote locations like this, standardization of design means a lot, because a small stock of low-cost parts protects all twelve engines. For dependable Diesel power *at the lowest cost per horsepower hour*, see your GM Diesel distributor today.

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GENERAL MOTORS
DIESEL POWER

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Coal preparation plants are solving a basic lubrication problem!

In one instance, 20,000 tons per day are processed for coking. Yet, *one* gear lubricant – Tycol Apreslube – serves throughout! Rather than chance a costly error by stocking and using eight to ten different lube oils, this operator found Apreslube ideal for literally hundreds of gears – worm, spur, and herringbone – in all sizes. Result? Simplification . . . and longer gear service! Apreslube's EP properties reduce wear to a minimum . . . other features combat moisture introduced through "breathing action".

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while sharing the tax burden on an equal basis.

The coal industry of West Virginia paid $17,115,000 in state taxes in 1952. Adding federal taxes the total tax bill was 30 million without including the hidden taxes, such as on materials and services required. State taxes paid by the coal industry consist principally of tax on gross sales and tax on property and equipment. It is paying unduly high on property compared to all other industries. Mr. Snoderly took the position that if more tax money is needed the gross sales part should be increased, for in that all industries share equally except that the coal industry needs some relief from paying gross sales twice or even four times where the coal is handled by brokers and dealers in the state.

COAL FROM CHEMICALS

The present status of coal carbonization and a description of a coal hydrogenation plant constituted the highlights of a slide-illustrated paper, "Coal Utilization for the Production of Chemicals," by Richard Gorman, design engineer, Carbide & Carbon Chemicals Co., S. Charleston, W. Va. While steel has increased 100% since 1930, chemicals have increased 600% and the organic chemicals show the best progress. The coal chemicals are organic and now, in spite of the growth of coal carbonization, there now is not enough coal tar.

Increased consumption of naphthalene, phenols, aromatic solvents and oils, and other products for producing plastics, detergents, synthetic fibers and so on, points to a future when the organic chemicals should be gotten from coal by the highly efficient hydrogenation rather than by carbonization, in which only about 30% of the coal goes to chemicals.

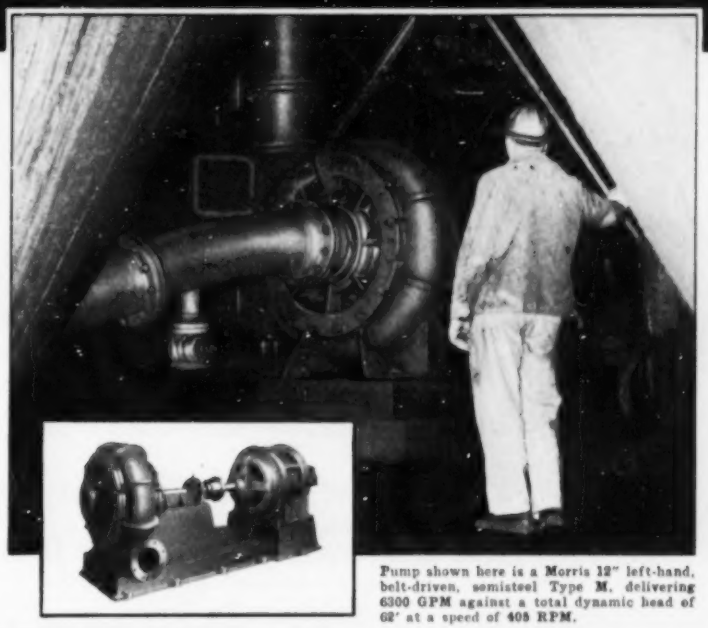
Carbide & Carbon's interest in coal is as long-term insurance for the future. Natural gas, formerly costing 3 to 5c per MCF in Texas, is now up to 10 to 15c and some predict it will go to 20 to 30c in a few years. Coal is recognized as the basis of industry.

After explaining photographs and drawings of the pilot plant at Institute, W. Va., Mr. Gorman answered a number of questions. Hydrogenation plants are not particularly concerned with the quality of the coal except that anthracite cannot be used. Ash in the range of 5 to 10% is reasonable. In Germany more than 70% of the coal fed to hydrogenation plants went to liquid products. Fusain goes through untouched. If there is germanium in the coal it can be recovered in the process. The pilot plant is an attempt to learn the cost of production at the present price of coal, and as yet the answer has not been obtained. Material costs will be greater than capital costs in producing chemicals from coal. It is thought that in the near future coal can be produced at half its present cost.

UNDERGROUND GAS STORAGE

Danger from natural gas storage in repressured pools under coal seams was highlighted in a paper on "Underground Gas Storage," by Ray Henderson, assistant chief engineer, Consolidation Coal

. . . for overall economy in delivering circulating water



Pump shown here is a Morris 12" left-hand, belt-driven, semisteel Type M, delivering 6300 GPM against a total dynamic head of 62' at a speed of 405 RPM.

MORRIS Type M Pump

The small high-speed pumps commonly used for circulating water are highly efficient—*if the water is relatively free of fine abrasive materials.*

When abrasive-laden water is carried, the high speed of these pumps accelerates the grinding action of gritty particles. Sealing rings are quickly cut and scored . . . the thinner casting sections break down rapidly—normal life expectancy is halved, frequently quartered.

MORRIS DESIGN ASSURES ECONOMICAL LONG LIFE

Where total heads do not exceed 120 feet, the larger, low-speed Morris type M Pump is more efficient for handling circulating water containing abrasive solids. Even the occasional big "tramp" piece—always a threat to the small pump installation—goes through the Morris without trouble. Depending on the pump size and total head, speeds range from a low of 188 RPM to a high of 1119 RPM.

Wearing parts are double the thickness of conventional clear water pumps. With economical upkeep a primary consideration in the design, sections subjected to most wear have been subdivided so that the greatest erosion bears upon smaller, less expensive parts. Optional use of special corrosion-and-abrasive-resistant alloys further increases the inherent long life on the Morris Type M.

Morris Engineers have been building pumps for all types of service for 88 years. Let them consult with you on your pumping problems. No cost. No obligation. Or, send for free Bulletin 175.

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If you're not completely satisfied with *your* wire rope service, try Red-Strand preformed. You'll experience the difference too.

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Co. (W. Va.), and in the lively discussion that followed. Four gas companies now have 29 gas-storage pools in West Virginia. The most apparent hazard is from uncharted wells which might be cut into, and from other uncharted wells from which gas might migrate great distances without being detected by the gas company.

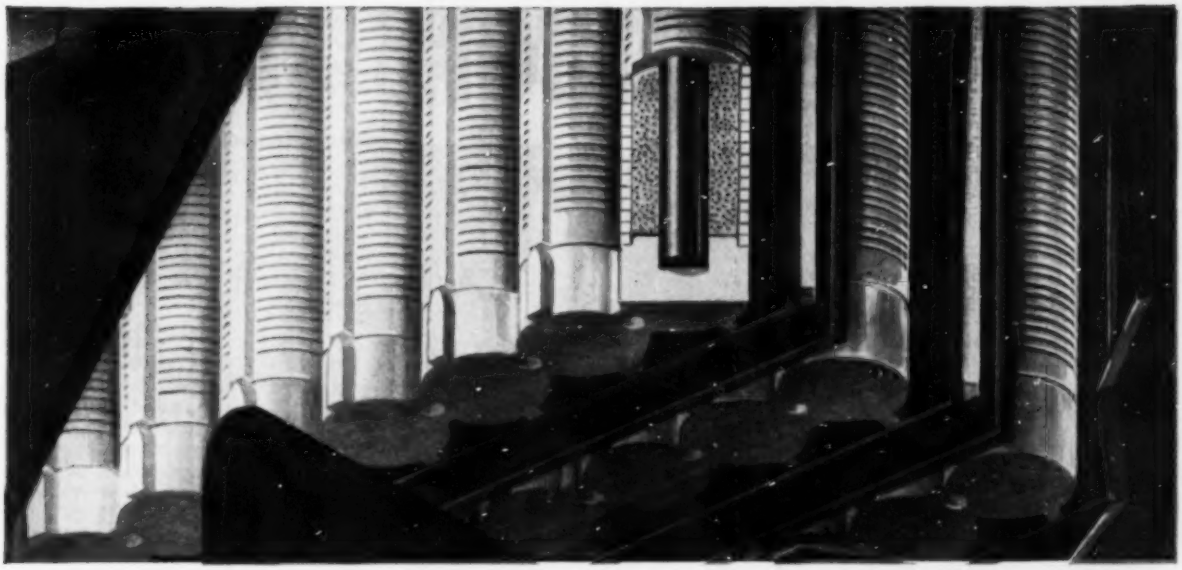
While past recovery of coal has been from above gas fields with diminishing pressures, it appears that increasing pressures greatly increases the danger. Mr. Henderson said that the gas company tries to detect old wells by searching old records, use of metal detectors, bulldozing the surface, etc. It may take a company as long as 3 yr to prepare a field and re-pressure it. While the storage of gas under or adjacent to coal areas is already acute in Pennsylvania, the coal industry of West Virginia is just getting interested in it.

Mr. Alexander, who was former chief, State Department of Mines, said that gas storage is perhaps the most serious problem of the mining industry in northern West Virginia. It became serious about 4 yr ago when mining operations cut into an uncharted well. The Department of Mines working with Paul Price, state geologist, has found about 60 uncharted wells, probably all drilled before 1904. It will take 3 or 4 yr more to complete the search. Many of the wells in northern West Virginia were drilled soon after the Civil War. The Department of Mines has no control over storage pools but there is a state law providing condemnation proceedings for storage if the Public Service Commission grants permission for the pool. Coal operators can protest at these hearings and resort to the courts. Mr. Alexander believes no re-pressuring should be permitted under mineable seams of coal.

M. H. Forester, vice president, Pittsburgh Consolidation Coal Co., warned that the natural thing for the gas companies to do to increase capacity is raise pressure above the original rock or hydrostatic pressure. He said the gas companies themselves don't even know the limits of their pools. They try to establish the limits by records of dry holes but what were then considered dry holes may have made considerable gas. Records are so incomplete that some charted wells have been found to be as much as 200 to 300 ft from the supposed locations.

Continuing, Mr. Forester said that to date there are no laws in any Appalachian state to regulate gas storage. However, five states in this area have eminent-domain laws for gas storage. The National Coal Association is just now getting for the first time information on gas-storage areas permitted by the Federal Power Commission, an agency in no way concerned with safety.

Mr. McCaa said that one gas company in northern West Virginia has become very active in the last month in locating mining pillar lines and future pillar lines, welding old pipelines, etc. Another speaker noted that some of the gas companies are at least trying to place their storage pools in areas not overlaid by mineable coal seams.



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Its larger positive plates, containing corrosion-resistant Silvium, are different . . . unique . . . exclusive! No other type of positive plate construction offers you the advantages of the T-H Exide-Ironclad, with its slotted plastic tubes, permanently sealed on the bottom with polyethylene tube sealer. More active material is exposed to the electrolyte, resulting in greater power. More active material is retained, providing higher battery capacity for a longer working life.

Other features include improved negative plates . . . practically indestructible Pormax separators . . . new sealing compound . . . shock-proof molded jar . . . unbreakable quarter-turn vent plugs of plastic . . . corrosion-resistant tray coating.

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YOUR BEST POWER BUY AT ANY PRICE!

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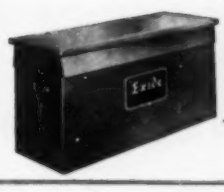
The new T-H Exide-Ironclad BATTERY

Thrifty Hauler



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MANUFACTURERS OF TACKLE BLOCKS, WIRE ROPE, ROPE FITTINGS—ESTABLISHED 1871

Mr. German said that based on his experience in degasification in the Pocahontas field it is possible gas might migrate 50 mi. Nobody knows.

Mine Inspectors Meet

Begins on p. 134

bolts at intersections and other wide spaces, bolt length and diameter, plate dimensions, diameter of hole at point of anchorage, and thickness of wedges; (2) methods for installing bolts, including the use of safety jacks, proper anchoring of bolts and proper use of tools; and (3) the effectiveness of installation.

Visual and mechanical tests can be applied to determine effectiveness of installation, Mr. Young stated. Inspectors should watch for signs of roof sagging or bowing, cracks and sloughing; cupping of bearing plates; failure of channels to conform to irregularities in the roof; distortion of angle washers; and protrusion of bolt ends. For mechanical tests, the roof-testing rod is almost useless in bolted areas, Mr. Young warned. The most practicable instrument for testing effectiveness of bolts is the torque meter, which, through measurement of the torque applied at the nut, can approximate the tension of the bolt. To test the security of bolt anchorage, a hydraulic pulling device is most useful, since slippage of the bolt is indicated by a drop in pressure on the gage.

Inspection of a roof-bolt installation is dependent almost entirely upon the judgment of the inspector, said L. R. Johnson, safety engineer, Peabody Coal Co., Chicago. Some standard practice as to hole depth and diameter with respect to bolt types (wedge or expansion shells) must be adopted that corresponds to bolt length, headers, plates and bolt diameters, and a study must be made of local strata to determine the best economical support, he pointed out.

Torque should be measured by a torque meter. If clutch wrenches are used, or if drills are used without a clutch arrangement, they should be set to slip at a predetermined torque setting. Torque should measure from 150 to 200 ft lb, Mr. Johnson said. As for pull tests, bolts that pull in the 5,500- to 12,000-lb range appear to be satisfactory. The mine foreman should pass on any deviation from the established bolting pattern, but only after consultation with the state inspector or the USBM representative. Wherever roof has spalled around bolts, the mine foreman should be notified immediately.

Cupping of bearing plates indicates that they are not thick enough, Mr. Johnson said. In Illinois, the first indication of a roof failure often is a runner or cutter along the ribs. For this, inspectors should be on the alert. Workers themselves have developed ways of knowing when bolts are being set properly. These ways are: (1) the sound of the drill; (2) the sound of a hammer on the bolt or the bearing plate; and (3) distortion of the plate or header. Though bolting costs run from 26 to 34c per ton of coal at the two mines Mr. Johnson

LIMA

Wheel or truck mounting is available on machines of ¾ and 1½ yards capacity.

THE ALL PURPOSE MACHINE

Here are four typical examples of the versatility of the LIMA Type 604. Realizing that most contractors bid various types of work, LIMA has gone to great lengths to make a machine that is easily converted in the field to shovel, crane, dragline or pullshovel, thus giving the owner the advantage of four machines in one.

Versatility is but one of the many advantages that make the Type 604 a leader in its class. For instance, air controlled clutches do all the work—with one slight touch of the levers, the hoist, crowd, travel and swing clutches can be engaged or disengaged, making for ease of operation. Anti-friction bearings in the drums and other important bearing points reduce destructive friction and lessens lubrication problems. Simplicity of design results in fewer working parts and greater safety for the operator.

For further information on the Type 604, write your nearest LIMA distributor or write to Baldwin - Lima - Hamilton Corporation Construction Equipment Division, Lima, Ohio, U. S. A.

CAPACITIES: Shovels ¾ to 6 cu. yds. Cranes to 110 tons. Draglines, variable.

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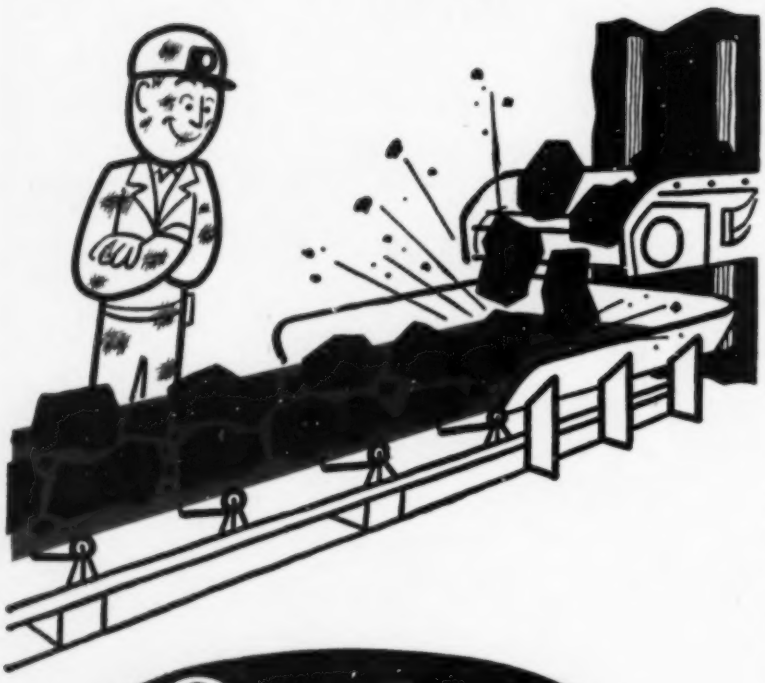

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discussed, the costs have been well worth while in view of the benefits derived, because there has been no serious injury attributable to bolt failure, Mr. Johnson reported.

Inspectors of Region IV, USBM, with headquarters in Denver, Salt Lake City and Phoenix, have been provided with hydraulic testing equipment for making roof-bolt anchor tests, torque wrenches for checking the tightness of nuts, gages for determining the diameter of drill holes, and gages for determining air pressure during drilling at a point near the drill, said E. A. Morgan, chief, Roof-Control Branch, Region IV.

Proper installation technique and testing at the very beginning of a bolting program are most important and every effort must be made to determine which type of bolt will be most effective in each mine, he contended. Tests show the minimum torque that should be applied to obtain suitable anchor. To determine whether holes of the correct diameter and wedges of the right size are being used, a pull test with hydraulic equipment is the only sure way. Good results now are being obtained in a salt mine by using a tapered ream in the last, or innermost, 6 in of 1¼-in holes. This development holds some promise of improving the anchoring quality of wedge-type bolts in coal or soft, friable slate, Mr. Morgan said.

Changes in roof-bolting methods since the system first was installed at operations of the Compass Coal Co., Philippi, W. Va., were recounted by J. S. Mathews, superintendent. Starting with wedge-type bolts on 3-ft centers, the company, following recommendations of state and federal inspectors, soon changed to 4-ft centers without loss of safety, Mr. Mathews said. Also, after starting out with steel channel beams across weak intersections, the company later switched to 2 x 8-in oak planks, with additional saving of money. The planks also have been found useful on the pillar line, where 30 in of soft shale lies directly above the coal seam. Use of 12-ft lengths of the 2 x 8 planks has enabled the company to extract pillars successfully. Finally, after several months of experiment with expansion-type bolts and 6 x 6 x ¾-in plates, the company went over 100% to expansion bolts, with still further savings.

Turning to pillar recovery at Compass Coal, Mr. Mathews explained that the original plan called for butt entries in panels of five. But it soon was clear that to maintain high tonnage per unit on retreat, butt entries would have to be increased to six, thus providing six to seven working places at all times. The change to a six-entry panel increased the tonnage from 325 tons per shift under the old system to 500 tons under the new system.

Successful pillar extraction depends upon good workmanship in bolt installation and the rapidity with which development and retreat work are performed. At Compass, entries do not exceed 1,800 ft in length. During the last stages of development of the six-entry panel, work is planned so as to have one side of the panel completed

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and a pillar line started while the other entries still are being driven. This provides a sufficient number of working places until a full pillar line can be developed at a 45-deg angle within the panel.

With development completed, work is concentrated on pillar removal. Falls are made as required, with the pillar being worked in cycles. This is done by taking one lift off a pillar on the gob side, leaving a 6-ft stump at the beginning of the lift and holing through a 3-ft wing at 8-ft intervals. Roof is bolted after each cut. After removal of a lift, corner and wing stumps are shot and the roof caves close to the remaining portion of the block. Recovery runs 92 to 94% under this system. Roof bolts do not interfere with making good falls, and they cost only 50 to 55c per ton, Mr. Mathews said.

Arthur J. Blair, consulting geologist, Birmingham, closed the Monday afternoon session with an address on iron-ore mining in Alabama.

The Tuesday morning session opened with a color film showing the continuous mining machine recently developed by Carbide & Carbon Chemicals Co., Charleston, W. Va. John H. Hansford, superintendent at the mining operation, commented briefly on the film, explaining that the machine shown was the third built by the company and that a fourth machine, incorporating many improvements, now is under construction. Ralph Beerbower, who, until his recent retirement, was with the Goodman Mfg. Co., presided at the session.

"In West Virginia, we do not find a fatality which can be attributed to a rubber-belt haulage system."

Approximately 340,000,000 tons of coal in 8 yr has been transported by belt haulage without a fatality, said H. P. Farley, secretary, Accident Prevention Commission, West Virginia Department of Mines, Charleston, W. Va. Even so, of the 18 mine fires reported in 1952 in West Virginia, seven were called belt fires. But the term "belt fire" may be a misnomer in 75% of the fires reported, since a belt fire most often is secondary to primary ignition elsewhere. Reported causes of so-called belt fires in the last 2 yr are: roof-falls on belts, causing friction; hot rollers; large lump of coal fouling belt, causing friction; bad electrical connections, igniting dust and then belt; slate falls on power lines, cutting insulation; improper installation of power lines; and fouling of conveyor pan being hauled on belt.

Citing tests made by the National Coal Board of Great Britain on belt materials, Mr. Farley reported that an all-wire belt with crude rubber compounds burst into flame after friction over a period of 193 min had raised temperature to over 550 deg F, but only after coal dust had been added at high-heat points; that a 5-ply neoprene belt, untreated fabric, $\frac{3}{64}$-in top and back covers, even after 306 minutes of heavy friction with coal dust added at high-heat points, never did ignite, though temperature reached 442

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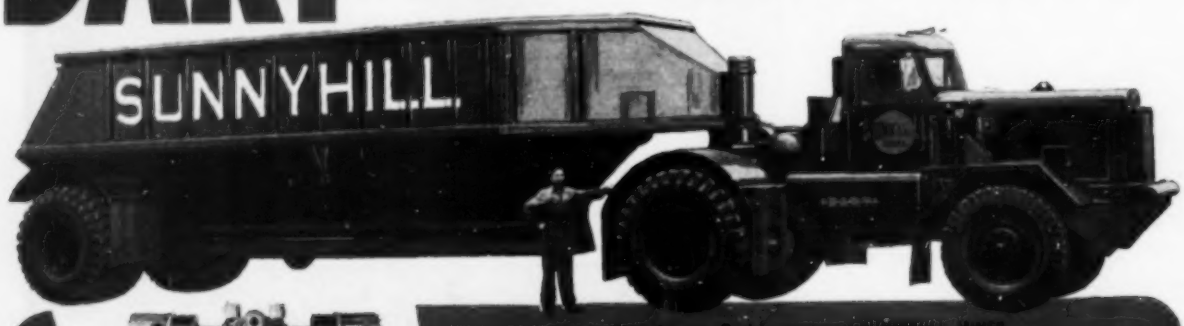

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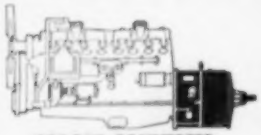

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deg F, but did break straight across; and that a polyvinyl-chloride belt, subjected to the same friction tests for 68 min, did not ignite but did break. Conclusions are: (1) conveyor-belt rubber becomes sticky at about 300 F and begins to flow at about 400 F; (2) cotton in the belt ignites at approximately 500 F; and (3) glowing cotton embers dropping into coal dust or grease will ignite the material.

As for neoprene belts, the neoprene will burn when in contact with a very hot flame but the compound will not support combustion when the source of the flame is removed and if no glowing embers drop from the belt. Ending his comments, Mr. Farley stated that if all belt installations were made in compliance with recommendations of the National Mine Rescue Veterans' Association and the laws of West Virginia, belt fires could be eliminated altogether.

Drawing on experience with a fire in the No. 3 Elkhorn mine, Pond Creek Pocahontas Co., Evanston, Ky., Dec. 13, 1952, A. D. Sisk, chief, Kentucky Department of Mines & Minerals, listed the following recommendations regarding belt installation and operation:

1. Rubber-belt conveyors should not be permitted to run when unattended.
2. Centrifugal switches, consisting of rollers and a switch-opening relay, should be provided.
3. Adequate ventilation should be provided so that the conveyors are on a separate intake air current with return to the main return by means of box regulators, thus preventing air from the belt from passing over working faces.
4. All new belt installations should conform to state mining laws.
5. All workmen should be provided with self-rescuers.
6. Sectionalized circuit breakers with overcurrent relays should be installed in all butt-entry feeder circuits.
7. Fire-fighting equipment—extinguishers, rock dust and pressurized water lines—should be available at each belt drive.
8. Belts should be patrolled and kept clean of dust and obstructions.
9. Controls should be installed along the belt, making it possible to stop or start the belt at desired places.
10. Fire-fighting plans should be drawn in advance and workmen trained.
11. Workers should be constantly reminded of the danger of mine fires, urged to track down the origin of smoke within the mine, and instructed in finding safe places when smoke appears.

"Safety is the product of the conviction, imagination and efforts of management."

Why have a company safety inspector? That was the question raised—and answered—by J. A. Boyle, chief mine inspector, Frick Dist., U. S. Steel Corp., Uniontown, Pa. Mr. Boyle contended that a company safety inspector performs functions that cannot properly be performed by state and federal inspectors. Among these are provision for liaison between management and operations at plant level and the supervisor of the

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Any two heads couple—and they're always ready to couple, because locks pivot freely in uncoupled heads. Movement of lock-control bar remains unrestricted until flanges of two heads come together.

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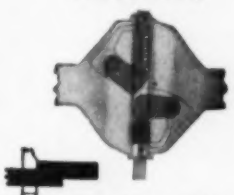
As pivoted locks swing into engagement, each control bar drops to lock against the flange of opposite head.

LOCK-SET FOR UNCOUPLING



Lifting and pulling either control bar unlocks the coupler and holds lock in lock-set position until heads move apart.

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Flexibility of Rubber

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particular managerial unit in which he works; provision of detailed, first-hand information about the local seam and local operations; the spotting and immediate elimination of hazards; development of ventilation and dust-control systems adapted to the particular operation's needs; application of state, federal and company laws and regulations; installation of equipment according to high safety standards; provision of escape routes and fire-fighting equipment; training in emergency procedures; maintenance of hoisting and transportation equipment for men and materials; development and promotion of a company safety program; timely dissemination of information gained from inspections; management of first-aid and rescue training; and evolution of company standards of safety.

A company inspector, Mr. Boyle said, should be skilled in practical mining fundamentals, should have sound common sense, should be convinced of his mission, and should be able to win the confidence and respect of workers.

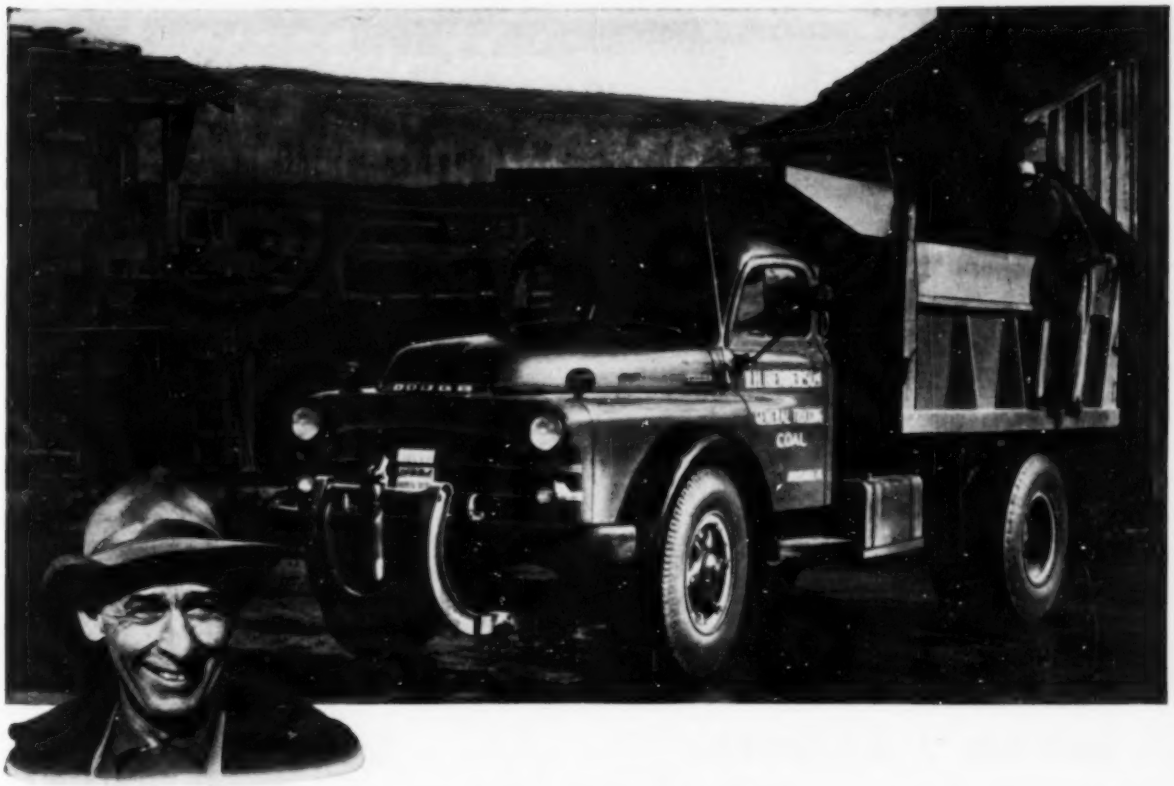
"Needed—A program that would restore safety consciousness to the mind of each individual."

Spurred by an unfavorable safety record in 1951, officials of Jones & Laughlin Steel Corp., Vesta-Shannopin Div., set up in 1952 a program to restore safety consciousness to the minds of workers, said W. Dan Walker, chief, Pittsburgh Branch, Accident Prevention & Health Div., USBM. Mr. Walker was the first speaker at the Tuesday afternoon session, with John M. Malloy, retiring Institute president, and Mr. Deike, incoming president, sharing the presiding officer's chair.

Cooperating in shaping the J. & L. plan were company officials, UMWA officials and men of the bureau. As developed, the plan involves underground classes in small units, each lasting for 1 hr over a 15-day period and taking place in a break-through within hailing distance of a working face, plus outside classes, 4 hr in length with frequent pauses to give the men a break. Inside classes are on company time; outside classes, held on Saturdays, are on the men's time. Instruction in the underground classes is by the conference method, with specially trained instructors in charge.

The course was built in several stages, Mr. Walker explained. First, a job sheet was prepared for each job in the mine. This job sheet included a step-by-step description of the job, a statement of the hazards threatening the man or men doing the job, a statement of the hazards threatening others near by, and a list of the corrective measures to be taken to eliminate the hazard.

The program has been in operation continuously, except for two work stoppages, Mr. Walker said. Over-all production has not fallen, as some officials predicted it would; the men are attending the outside classes in gratifying numbers; and non-paid classes in the area have not suffered. Men now are more



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Dodge trucks are built for big loads and rough roads. Frames are made of tough, hot-rolled steel with ample twist-resisting crossmembers and long, tough springs. Shorter wheelbases, wide front treads and shorter over-all lengths give Dodge unequaled maneuverability and handling ease. And for smooth, sure stops with less pedal pressure, Dodge provides new rear brakes, of the advanced dual-primary-type, in 1- through 4-ton models. Your Dodge dealer is making the kind of deals you can't pass up! See or call him soon!

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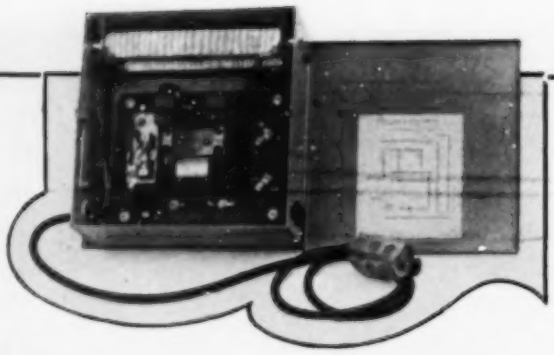
"My Dodge truck carries top loads of coal each trip. That calls for plenty of power—and I find Dodge power is great!

"Speaking from experience, Dodge is good on maintenance, too. It's also the nicest handling truck I've ever driven; drives like a pleasure car even when it's loaded. I've recommended Dodge trucks to lots of my friends. In fact, I'm getting another Dodge truck soon myself!"

DODGE
"Job-Rated" TRUCKS



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BELT FASTENER No. 500

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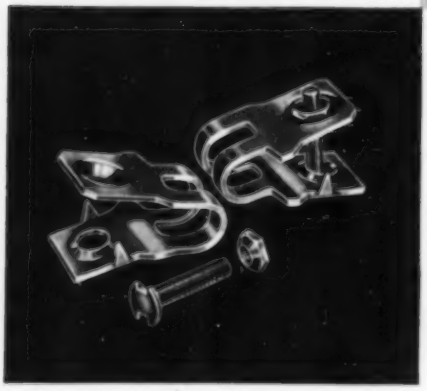
Specially designed to permit quick and easy method of adding to, or reducing length of belt. Just pull the hinge pin to open joint.



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careful about testing roof, testing for gas, caring for flame-safety lamps, inspecting electrical equipment, placing and removing nips, and closing ventilating doors. More people are wearing goggles. Hand tools are being carefully used. Gripes are brought into the open, with resultant relief of pressure. Polls show that the men like the method of instruction, feel that they have a part in the progress of the course, value the help they have obtained from the coarse, and want similar courses to continue.

"With the increase in the number of supervisors needed for mechanical mining, there has come a corresponding increase in accidents to supervisors."

Of the 153 fatalities occurring in West Virginia in 1952, 13 occurred to supervisors, reported Joseph Bierer, chief, West Virginia Department of Mines, Charleston, W. Va. One of these fatalities resulted from haulage, eight from falls of roof and coal, one from electricity and three from other causes. In fact, seven occurred while the supervisor was testing roof and might have been avoided by approaching more cautiously, tapping the roof more lightly in sounding, or setting safety posts at the start. Haulage accidents involving supervisors may have been caused by lack of quick reaction (a man's reflexes often slow down by the time he is old enough to be a supervisor) or by lack af familiarity with details of the haulage route, such as rough places, high joints and local dips.

The supervisor's job is especially hazardous, Mr. Bierer explained. He must be everywhere at once and is responsible for a wide variety of operations including cutting, blasting, loading and hauling. He must look after supplies and must guard the safety and health of his men. He must precede his men into areas that are unsafe or thought to be unsafe. And he must take care of emergencies. In all probability, therefore, the accidents that happen to supervisors arise from acts that are repeated not once, but time and time again, with the result that over-confidence may develop. "It is to be hoped," Mr. Bierer said, "that their knowledge will make supervisors more aware of the chances they take and influence them to be more cautious."

Narrating actual accidents that have occurred to supervisors within his experience, J. V. McKenna, acting deputy secretary, Pennsylvania Department of Mines, listed the following causes of accidents to supervisors:

1. They regard their job as commonplace and routine and thus become case-hardened and prone to accidents.

2. They become careless for one or more of several reasons—dissatisfaction with the job, annoyance at working conditions, domestic troubles, etc.

3. They take short cuts.

4. They fail to take quick, direct action to remedy doubtful or dangerous condi-

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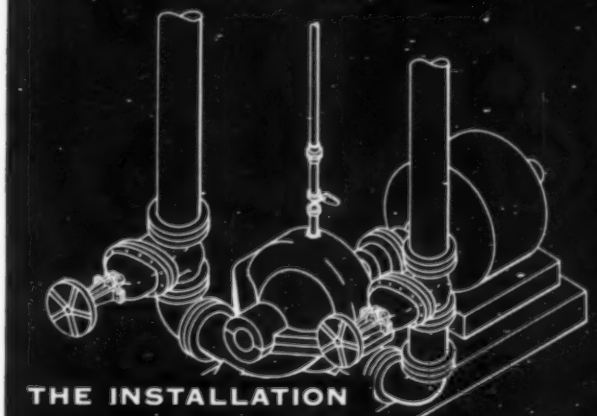

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SUITABILITY:
Doing the job for 50 years

MAINTENANCE COST:
Routine care only

SERVICE LIFE:
Installed 1903—Now on new pumps

OPERATING RESULTS:
No shutdowns for valve trouble

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At The Great Western Sugar Company, Longmont, Colorado, plant, with Crane Iron Body Wedge Gate Valves on suction and discharge lines of juice pumps.

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Originally the Crane valves were installed on belt-driven pumps when the plant was built in 1903. In 1952, the old pumps were replaced. Nearly all the Crane valves were found in good condition and put right back in service on the new pumps.

It's no easy job these Crane 6 and 8-inch, 125-pound brass-trimmed gate valves have been doing since 1903. The plant operates on 80-day continuous beet sugar campaigns. In spite of intermittent operation, and with periodic routine maintenance only, the Crane valves never fail to operate freely, smoothly, and seat tightly. For 50 years they have assured dependable, positive flow control in event of pump failure—and they're still doing it.

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Here is today's model of these "50-year service record" Crane 125-pound iron wedge gates. Still made to the most rigid quality standards, these modern valves keep building unusual performance records in every industry. They come in patterns for every need. See your Crane Catalog or your Crane Representative.

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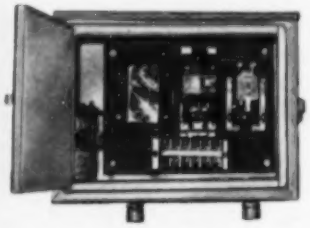

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Provides Safety

Photograph at right illustrates how Belt Conveyor may be stopped and started at any point along belt line.

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Alternately stops and starts Conveyor by pressing together two bare wires mounted along beltline.

A Timing Relay is used to permit motor to stop before being re-started—thus prevents jogging —can be locked out while repairs to Conveyor are being made.

Two dry-cells provide 1½ or 3 volts to bare wires.

Accessories, including bare contact wire, insulators, insulator brackets and tension springs available.

REQUEST BULLETIN NO. 1125

ENSIGN ELECTRIC & MANUFACTURING CO.

914 Adams Avenue

Huntington, West Virginia

tions, even though they are quick to observe them.

5. They take chances to increase production and thus expose themselves and their men to additional hazards.

6. They become reckless and overconfident.

The remedy, Mr. McKenna said, is training for supervisors. To make such training effective, however, top management must take a keen interest in the program, minutes of the meetings must be kept, and recommendations must be followed up quickly and effectively. If supervisors are expected to leave safety meetings with a clear idea of what safety is, safety alone must be the theme of the meeting—not costs or production. Instructors should be practical men, well versed in coal mining and its dangers, and should be able to command the respect of their students. Among other hints for successful training of supervisors, Mr. McKenna suggested on-the-job techniques, follow-through and check-up on the trainees, individual across-the-desk discussions between supervisors and their superiors, and insistence upon immediate action to correct infractions.

"We pioneered the use of shuttle cars in low coal which, a few years ago, could have been mined only with conveyors."

Describing shuttle-car operations at two mines of the Princess Elkhorn Coal Co., David, Ky., Irvin C. Spotte, general superintendent of the company, said that the factors that contribute to safety with shuttle cars in high coal are identical with those in low coal. The ingredients of safety with shuttle cars are clear statement of policies, procedure and standards of safety by top management; competent and effective supervision coupled with leadership; careful selection of supervisory officials; thorough indoctrination of supervisors in the principles and viewpoint of management; repeated insistence upon high standards of foremanship performance; continuous training of foremen; assignment of workers to the jobs they are best suited for; and utilization of all resources for training of workers in job performance.

Turning more specifically to thin-seam mining with shuttle cars, Mr. Spotte recommended a proper system of mine projections, with breakthroughs on 45-, 60- or 75-deg angles; provision for two-way shuttle-car haulage; adaptation of ventilation to eliminate check curtains on haulways; and adequate overhead clearance. As for equipment, it should be carefully maintained and inspected; lights, brakes, tires and steering mechanism should be kept in good working order; and electrical apparatus should be checked frequently. Though roof-bolting has solved many roof problems, problems of corresponding magnitude often arise from soft or muddy bottom. The only remedy for bad bottom is an adequate drainage system or, as a last resort, a floored bottom.

CHEVROLET ADVANCE-DESIGN TRUCKS

More work per dollar ... and here are 4 powerful reasons why!

MORE POWER AT LOWER COST! Watch costs go down when you put the new heavy-duty power of Chevrolet's advanced Loadmaster engine to work! The new high-compression ratio of 7.1 to 1 in this great engine brings you more power and even greater economy than before. Chevrolet's Thriftmaster engine, too, in light- and medium-duty models offers exceptional economy of operation.

FACTORY-MATCHED TO THE JOB! Some jobs demand more power. Some demand stronger springs. But, *whatever* the requirements of your job, Chevrolet trucks are carefully *factory-matched* to the work to be done, with the *right* power—and the *right* units from tires to axle, springs to clutch—to handle that work at lowest cost.

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LOWEST PRICED LINE! Chevrolet trucks are known for qualities and features matched by no other trucks. Yet, with all these advantages, the Chevrolet line lists for less than any other trucks of comparable size and specifications. See your Chevrolet dealer. Chevrolet Division of General Motors, Detroit 2, Michigan.

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TWO GREAT VALVE-IN-HEAD ENGINES—the Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load. **POWER-JET CARBURETOR**—for smooth, quick acceleration response. **DIAPHRAGM SPRING CLUTCH**—for easy-action engagement. **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **HYPOID REAR AXLE**—for dependability and long life. **TORQUE-ACTION BRAKES**—on light-duty and medium-duty models and on front of heavy-duty models. **TWIN-ACTION REAR BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty models. **CAB SEAT**—with double deck springs for complete riding comfort. **VENTIPANES**—for improved cab ventilation. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—for easier handling. **UNIT-DESIGNED BODIES**—for greater load protection. **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.

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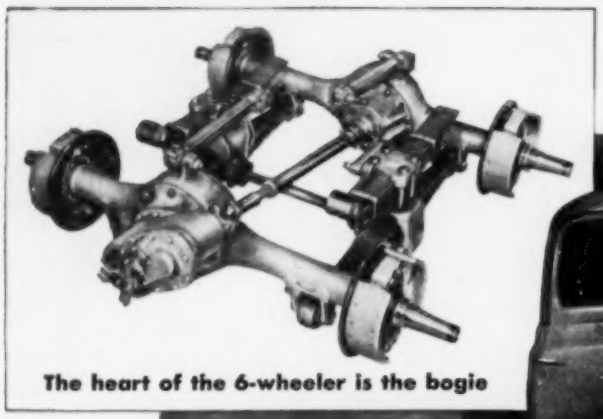

The heart of the 6-wheeler is the bogie

Proved performance

makes the sales leader

your best buy

Proved bogie design. International RF-210 Series, GVW ratings, 37,000 to 45,000 lbs. Gasoline, LPG or diesel power.

"Tough Job" engineering has made International Trucks the heavy-duty sales leader for 21 years. International 6-wheelers give you proved performance PLUS the famous International bogie with the third differential.

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The third differential and power divider allow each wheel to rotate independently. There is practically no tire scuffing, "axle fight" or power loss. Perfect matching of tires is unnecessary. Fuel consumption is lower. Under adverse conditions, the third differential can be locked out, giving positive traction to both axles.

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Reduces road shock by 50%. "Walking action" design keeps chassis frame and body level while bogie "walks" over obstructions and levels out the road.

Extra strength without extra weight. More payload per pound of chassis weight results from elimination of unnecessary dead weight. Strength is concentrated where needed.

Load stresses equalized. Load is carried from the frame to the axles at *four* points.

Compare performance . . . value . . . and price. Get all the facts on International 6-wheelers—*proved* for top performance and greater operating economy—from your International Dealer or Branch today.

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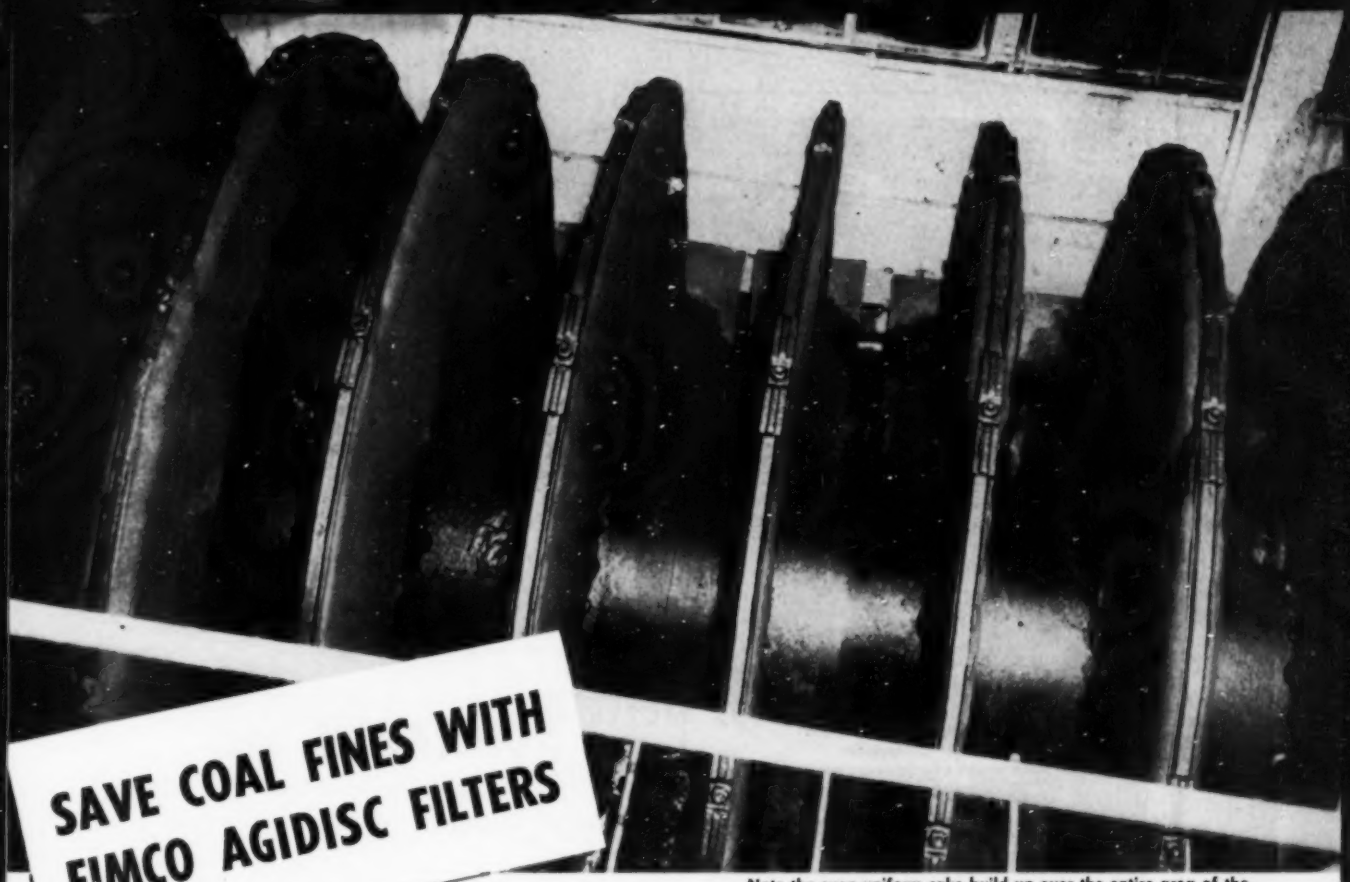


SAVE COAL FINES WITH EIMCO AGIDISC FILTERS

Coal Fines can be saved at a profit. Many companies are installing Eimco Agidisc Filters with the following results:

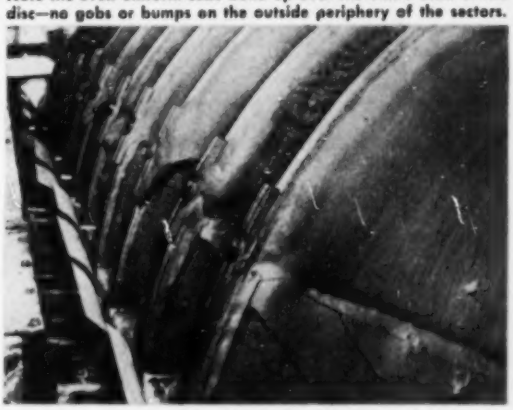
1. Reduced moisture content of fine coal.
2. Clean, clear filtrate.
3. Uniform cake distribution over entire surface of disc sector.
4. Greater tonnage dewatered per square foot of filter area.
5. Greater profits from sale of reclaimed fines.

Eimco Agidisc filters are heavy-duty machines built for continuous 24 hour operation. They require a minimum of mechanical attention and are absolutely dependable.

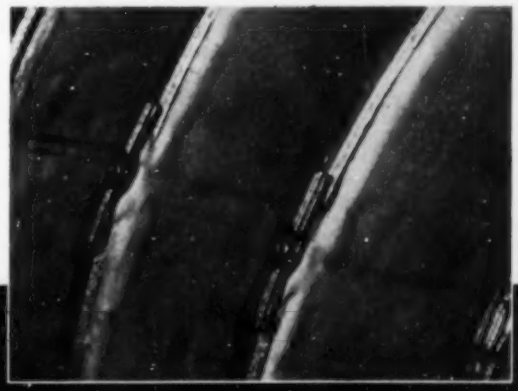
More than half a century of service to the mining and processing industries gives Eimco the necessary background to serve you.

Coal samples may be sent to our laboratories for free filtration analysis. Write for instructions for shipping samples.

Note the even uniform cake build up over the entire area of the disc—no gobs or bumps on the outside periphery of the sectors.



This cake has less moisture content and discharges easily



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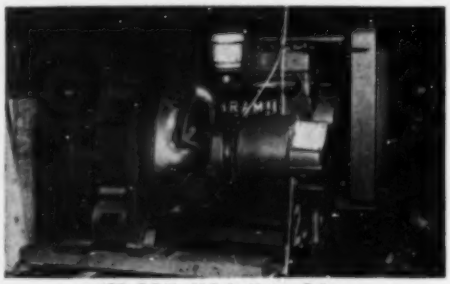

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Schramm Air Compressor

600 C.F.M. Diesel Engine Driven
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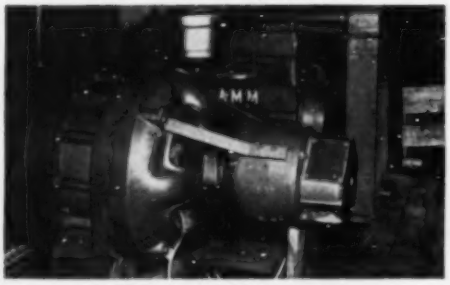

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Schramm Air Compressor

One of three Schramm Portable
Air Compressors on the job.

COAL

TONS OF IT . . .

Schramm Air Compressors are very much in evidence on this job of diverting the Lackawanna River and then mining the river bed . . . a feat being accomplished by the Booth Construction Company with the aid of Schramm Compressors.

Over a five-year period, this mine has produced over 500,000 tons of coal and indications point to continued large scale production.

Three Schramm stationary units are on the job . . . a 600 c.f.m. diesel engine drive and two motor driven 420 c.f.m. compressors installed nearby. In addition, 3 portable Schramm compressors are used where extension of pipe lines is not warranted.

For your many air jobs, specify Schramm. Write today for catalog.

SCHRAMM, INC.

The Compressor People

WEST CHESTER • PENNSYLVANIA

. . . a section of the Lackawanna River—now an open pit mine of the Booth Construction Company.

Conveyor Belt Rollers get positive lubrication with a Model 6679-J high pressure lever gun. Pressure flushes bearings completely, gives them protection from abrasive coal dust. Alemite Loader Pump fills gun quickly, efficiently.

Alemite Centralized System, shown here on a shaker assembly, lubricates all bearings at once, gives constant protection with *no downtime!* Avoids the possibility of missed bearings. Effects important savings in production, maintenance, lubricants!

Save 23.9 man-hours for every hundred pounds of grease applied! This is an important saving. Even more important is the complete protection essential machines receive from Alemite power lubrication methods and equipment!

From Face to Surface to Siding

THE MOST PUNISHING ROAD IN THE WORLD!

...and Alemite "Friction Fighters" guard every step of the way!

Slashing costs...boosting tonnage!

Few industries present the lubrication problems that confront coal mining and processing operators daily. Every day, every hour is a grueling test of machine endurance. Dampness, dust, abrasive grit, heavy loads threaten bearings at every turn. Yet, all-important tonnage depends on their unfailing operation. Keeping that tonnage rolling by protecting these essential bearings is the job performed by Alemite "Friction Fighters"—efficiently and at low cost!

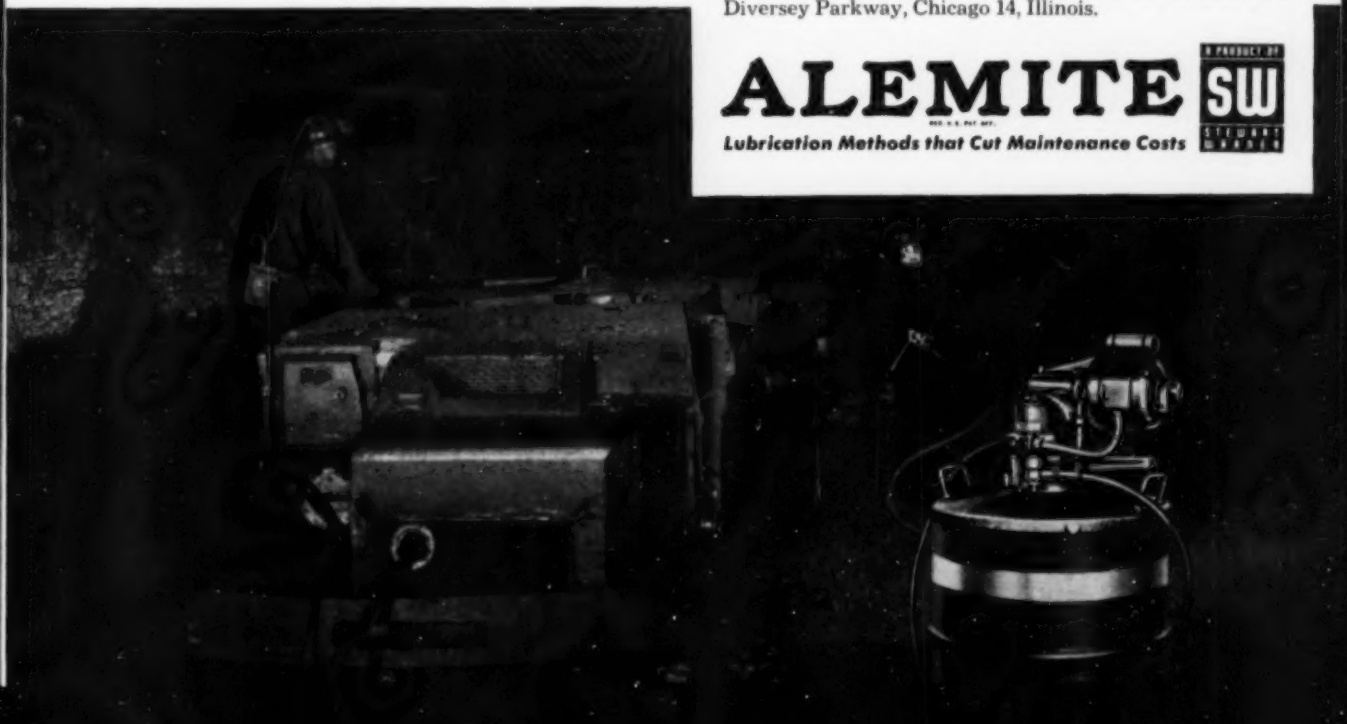
Deep in the mine where machine failure means costly delay at best, and catastrophe at worst, Alemite has proved itself best on all types of machines. Proved most dependable for all types of machine motion. Chain drives, reciprocating parts, conveyor drives, all shafts, heavy or light, any and all mining and processing equipment is best served by Alemite. The proof is in the overwhelming majority of major plants and mines that use and depend on Alemite equipment and lubrication systems.

Alemite slashes downtime—boosts tonnage! Alemite methods of loading, transferring and applying grease reduce downtime and chances of bearing failure. Keep lubricants "refinery clean," give bearings positive protection. Find out how Alemite can help you. Write Alemite, Dept. E-73, 1850 Diversey Parkway, Chicago 14, Illinois.

ALEMITE

A PRODUCT OF STEWART-WARNER

Lubrication Methods that Cut Maintenance Costs



NEW BEAUTY IN ALUMINUM INDUSTRIAL SIDING

Installed by MacArthur Company, one of Reynolds approved jobber-erectors for the Austin Company, General Contractors. See below.*

When the Cochran Foil Company, Louisville, Ky., wanted siding as outstanding in appearance as in performance, the specification was obvious...Reynolds Ribbed Embossed Siding. Here is rustproof, corrosion-resistant aluminum *plus* modern architectural design. Applied cost is low. Maintenance cost is practically nil. Aluminum's heat-reflectivity cuts the cooling cost of the building in summer, cuts fuel cost in winter. Light-reflective inner surface is a well-known extra advantage. For cost-cutting efficiency, specify aluminum. For efficiency *plus new* beauty, make it Reynolds Ribbed Embossed Siding.

DESCRIPTION:

METAL THICKNESS: .032" (22 U.S. Std. Ga.).

FINISH: Stipple-embossed.

LENGTHS: 5', 5½', 6', 6½' and so on to 13½'; also 13'10". Special lengths to order.

WIDTH: Over-all width 33⅜", nominal coverage 32".

RIBS: Pitch 4" center to center, depth 1".

WEIGHT: 59 lbs. per 100 square feet.

*Comprehensive material and installation service on Reynolds Industrial Building Products now available through an approved jobber-erector system. For literature and technical data, call the nearest Reynolds office listed under "Building Materials" in classified phone books of principal cities. Or write to: **Reynolds Metals Company,** Building Products Division, 2041 South Ninth St., Louisville 1, Kentucky.

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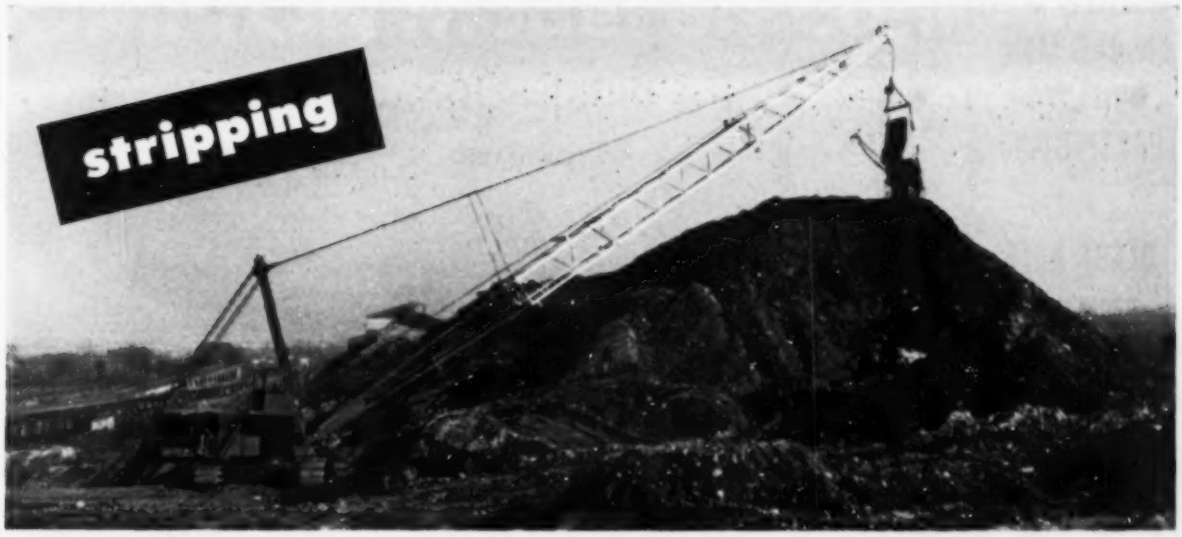

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There's a big swing to mighty Manitowocs all through the mining industry — a big replacement trend as more and more operators, after studying costs and production figures, switch to Manitowoc.

You'll find Manitowocs ideally suited to your job too, because they're specially designed for mining. You'll find features no other excavator can match size for size — extra long hi-lift shovel booms for loading and stripping — extra long dragline booms with big bucket capacity for long reach and big yardage — long crawler lengths for maximum stability and flotation — more power on the bucket because of main machinery simplicity — and the exclusive TORQUE CONVERTER DRIVE which adds extra yardage and faster production on every cycle.

Ask the Manitowoc owners in your vicinity — check for yourself — find out why the big swing is to Manitowoc. Manitowoc Engineering Corp., Manitowoc, Wisconsin.

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SHOVELS 1-5 YD. Speed Crane CRANES 18-100 TON

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THIS HOSSFELD ROCK DRILL

with prospecting attachment will cut your drilling costs to as low as 30c per foot . . . give you accurate samplings to 70 feet deep. It's a compact unit that can be moved into hard-to-get-at places.

- **POWERFUL DIRECT DRIVE**
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BLAST HOLE DRILLING can be done faster and better, too. Holes are full diameter all the way. Drills at any angle from vertical to horizontal.

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COMPTON Model 36 Coal Auger

designed for { Maximum recovery ...at Minimum cost

The new Compton Model 36 Coal Auger is the answer to the demand for rapid, economical high wall recovery in small, narrow pits. Only 36 feet long and weighing approximately 25 T., the Model 36 includes all the design advantages of the other Compton Coal Augers.

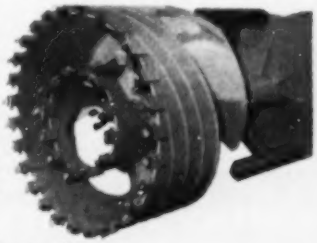
- Convenient, accessible auger sections racked on the frame.
- Synchronized winches for handling auger sections.
- Hydraulically operated pilot pan eliminates spillage between machine and highwall.
- Elevating conveyor is integral part of machine.
- Hydraulically-controlled swiveling discharge chute permits uniform trimming of trucks.
- Hydraulic jack legs (with self-leveling pontoons for better floatation) allow drilling up to 160 feet without misalignment.
- Single or vertical overlapping holes can be drilled in varying coal seam thickness.

The Compton Model 36 Coal Auger paves the way to higher quality through selective mining! Up to 60 Tons per hour recovered in actual production tests! Plan today to expand your present or future developments with Compton Coal Augers.

(Write for details about other Compton Auger Models 42, 48 and 56.)

Model 36 SPECIFICATIONS

Length: 36 *feet* *Weight: Approx.* 25 *T.*
Carries eight 20 *ft. auger sections*
Required pit width: 38 *feet min.*
Power: 150 *hp Diesel engine*
Hydraulic Frame Jack Lift: 54 *inch*
Auger Diameters: 74 *inch to* 84 *inch*
Possible Drilling Depth: 160 *feet*



The Compton Cutting Head — non-clogging type with a built - in spider bearing assembly — increases production by drilling straighter holes with less frictional drag.

Consult a Compton Engineer for Details

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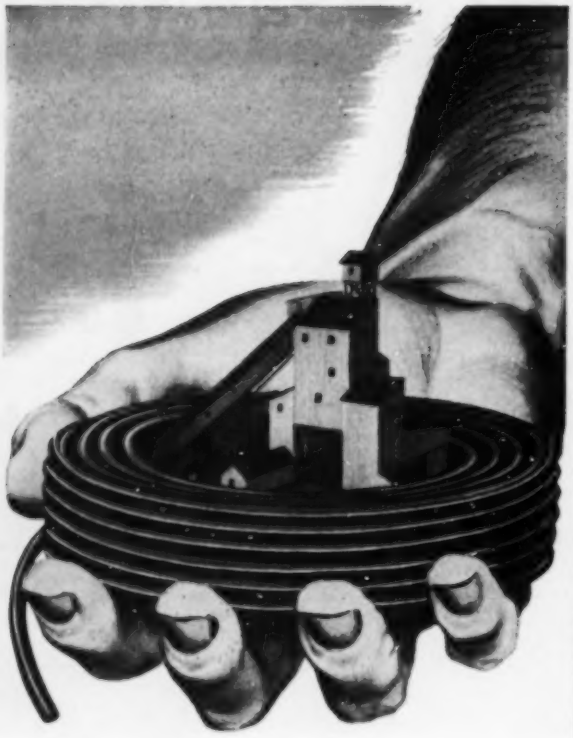

Carlon PIPE

costs less . . . lasts longer!

CARLON cuts mine piping costs because it's easier to install. It's lightweight and one man can handle a 400-foot coil with ease. Because **CARLON** is flexible and furnished in long lengths, fewer fittings are required to follow irregular surface contours or curving slopes and entries. Connections can be made quickly . . . efficiently with molded plastic fittings.

CARLON pipe lasts longer. It's guaranteed forever against rot, rust and electrolytic corrosion. **CARLON** permanently resists acid and alkaline mine waters to give it a trouble-free service life many times longer than ordinary pipe.

Buy the pipe that costs less . . . lasts longer.

Buy the Pipe with the Stripe!

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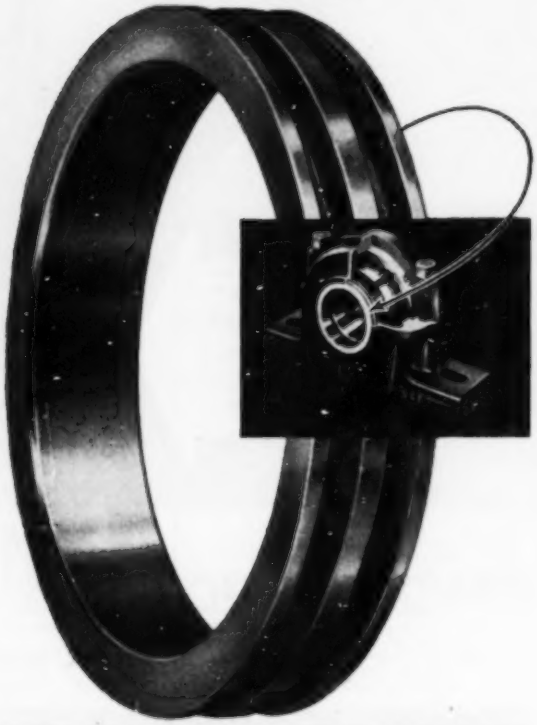
KEEPS DIRT OUT



Here's why SKF Triple-Seal "SAF" Pillow Blocks are your solution:

- SKF Triple-Seal "SAF" Pillow Blocks are easy to install and inspect.
- The Triple-Seal rotating rings provide effective sealing from dirt; retains any kind of lubricant.
- The bearings are self-aligning.
- Available with ball bearings or spherical roller bearings, free or held . . . for either adapter mounting or direct mounting of bearing on shaft.

When you have a bearing replacement to make, call your SKF Distributor. He'll show you *why* you will minimize bearing trouble with SKF Triple-Seal "SAF" Pillow Blocks. Remember—your SKF Distributor is a bearing *specialist*.

7812

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.,— *manufacturers of* **SKF** *and* HESS-BRIGHT *bearings.*

SKF

BALL AND ROLLER BEARINGS

YOU CAN...

TAKE IT WITH YOU

IT'S PORTABLE!
Easily transported from job to job and set up for use in minutes.

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Platform Lengths:
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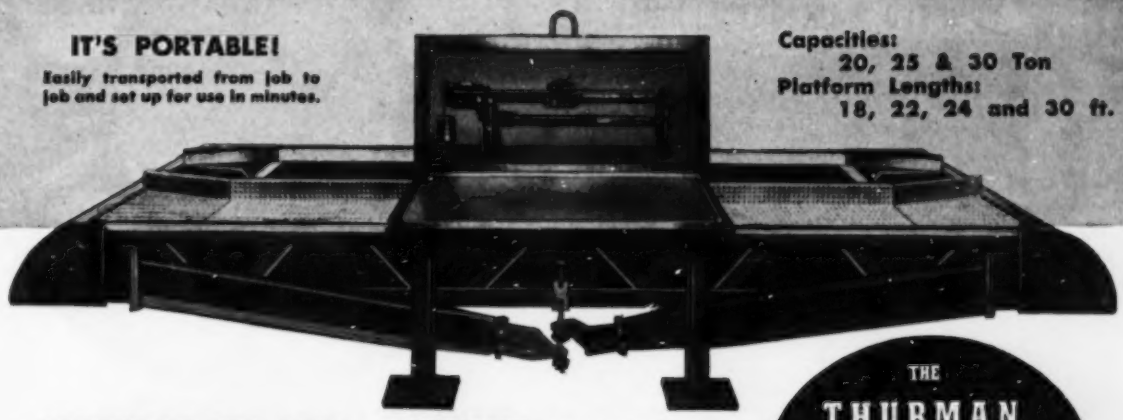

REMOVABLE SIDE ARMS
The assembled scale can be moved by merely removing six bolts which hold the side levers in place. The complete scale can then be lifted as a unit and loaded onto a truck. Once positioned, it can be ready for use in minutes.

ACCURATE Perfectly balanced for lifetime accuracy. Wide steel bases, at both ends, support scale therefore require no concrete footing. Easy to read weighbeam is chrome-plated. Other vital parts are electro-plated against corrosion.

THE THURMAN PORTABLE TRUCK SCALE

Est 1918

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HIGH PROFIT STRIP MINE NEAR PITTSBURGH, PENN.

This business shows a steady 35% net profit after management salaries, depletion, etc. Operation will bear rigid investigation. Property includes 1,200 acres on a long term royalty lease, with an estimated 5,000,000 tons of coal easily accessible. Nearby Pittsburgh industries assures steady demand. Equipment and buildings are in excellent condition and include: 1 Model 1201 Lima shovel, 1 Bay City shovel, 2 Model TD-18 bulldozers, McCartney drill, pumps, hose, tools, etc., tipple, crusher, scale house & garage. Sale price, including complete inventory, is only $208,000.

FOR COMPLETE DETAILS AND DATA REFER TO PA 388

ALLSTATE BROKERAGE CORPORATION
79 W. Monroe Street, Chicago 3, Illinois
Telephone—Financial 6-2694

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Diamond Core Drilling Contractors

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GASOLINE • STEAM • ELECTRIC DRILLS
WE PRE-GROUT SHAFT LOCATIONS
HORIZONTAL DRILL HOLES FROM 3" TO 16" FOR DEWATERING MINES
OUR OPERATORS ARE HIGHLY SKILLED

WE HAVE ALWAYS GUARANTEED SATISFACTORY COAL CORES
We solicit your inquiries

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HI-SPEED HORIZONTAL DRILL

• Drills a 6-inch Hole in two-thirds the ordinary time •

Included in the new design is an auger rack which saves on drilling time. The augers are on the machine as it is moved from hole to hole. Another feature, for faster set up and smoother drilling, is the four individually adjustable level jacks. Automotive steering is optional.

COMPLETELY RE-DESIGNED
Around a 40 H. P. ENGINE

• This HI-SPEED DRILL is designed for drilling 5 - 6 - 8 inch holes to 100 feet or more. The 40 H. P. engine with four drilling speeds makes possible the reduction of footage time by one third. This new drill, the very latest in design, is equipped with self-starter and generator, dual type front wheels, truck type rear axle with hydraulic brakes and traction drive with both forward and reverse. Here is greater speed in retrieving augers and four rotating speeds and reverse for drilling and cleaning the hole. Here is accuracy and mobility. Here is the modern answer to faster, lower-cost drilling.

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Send for Complete Details.

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- **Prefabricated Piping**
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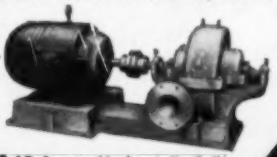
— such as water supply, brine circulation, booster service, white water and overflow, hot well, makeup water, etc., etc.

Capacities to 1,200 G.P.M.

Heads to 460 Ft.



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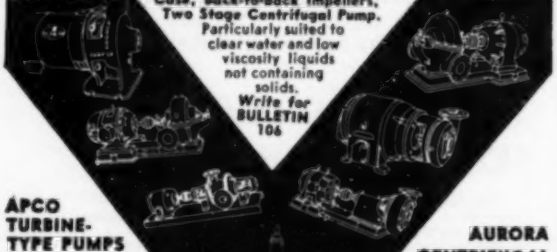
TYPE-AD Aurora Horizontally Split Case, Back-to-Back Impellers, Two Stage Centrifugal Pump. Particularly suited to clear water and low viscosity liquids not containing solids. *Write for* **BULLETIN 106**



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AURORA CENTRIFUGAL PUMPS are available in many types and sizes —all noted for their streamline coordination between impellers and shells.

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AURORA PUMP COMPANY

SUBSIDIARY OF THE NEW YORK AIR BRAKE COMPANY

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NOW-"real" low type Storage Battery Locomotives

Low type RANGER
Height—25" to 33" depending on battery capacity required.
Weight—3T to 5T. Track Gauge—18" to 56½".

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Height—26" to 33" depending on battery capacity required.
Weight—6T to 10T Track Gauge—18" to 56½".

All Greensburg Storage Battery Locomotives are custom built to your individual requirements in single or double motor drives with drum or contactor type controllers. Because of their modern engineered design, our locomotives have, time after time—on job after job, proven themselves more efficient . . . given longer battery life and outperformed all other storage battery locomotives of equal weight and battery capacity.

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Exploration for coal and other mineral deposits. Foundation test boring and grout hole drilling for bridges, dams and all heavy structures.

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. . . Here is GUARANTEED MAGNETIC PROTECTION for INDUSTRIAL and PROCESSING USES!

MAGNETIC PLATES—Std. widths 4" to 26"; Lengths and number of poles as required. Specials on order.

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MAGNETIC HAND AND ROAD SWEEPERS—Available in Standard, Heavy-duty or Hi-Intensity Models. Sweep widths 12", 18", 24", 36", 48", 60" and 72".

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Once is not enough!

The need for blood is greater than ever, not only for men wounded in combat, but here at home . . . to cure disease, to meet accidents and disasters, and to prepare for civil defense.

Our quota can ONLY be met, if those who give *keep on* giving . . . regularly!

You CAN give more than once . . . as often as every three months with complete personal safety. The more often you give the more often you save a life. For every pint of blood you give goes to someone who needs it desperately.

Remember . . . once is NOT enough. Give blood again and again! Call your Red Cross, Armed Forces or Community Blood Donor Center for an appointment to give blood today.

GIVE BLOOD

...give it again and again

BUSINESS EXECUTIVES!
CHECK THESE QUESTIONS

If you can answer "yes" to most of them, you—and your company—are doing a needed job for the National Blood Program.

- ○ HAVE YOU GIVEN YOUR EMPLOYEES TIME OFF TO MAKE BLOOD DONATIONS?
- ○ HAS YOUR COMPANY GIVEN ANY RECOGNITION TO DONORS?
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- ○ HAVE YOU ARRANGED TO HAVE A BLOOD-MOBILE MAKE REGULAR VISITS?
- ○ HAS YOUR MANAGEMENT ENDORSED THE LOCAL BLOOD DONOR PROGRAM?
- ○ HAVE YOU INFORMED EMPLOYEES OF YOUR COMPANY'S PLAN OF CO-OPERATION?
- ○ WAS THIS INFORMATION GIVEN THROUGH PLAN BULLETIN OR HOUSE MAGAZINE?
- ○ HAVE YOU CONDUCTED A DONOR PLEDGE CAMPAIGN IN YOUR COMPANY?
- ○ HAVE YOU SET UP A LIST OF VOLUNTEERS SO THAT EFFICIENT PLANS CAN BE MADE FOR SCHEDULING DONORS?

Remember, as long as a **single** pint of blood may mean the difference between life and death for **any** American . . . the need for blood is **urgent!**

NATIONAL BLOOD PROGRAM

McCarthy Drills FOR EASIER—FASTER BLAST HOLE DRILLING

- McCARTHY DRILLS PAY THEIR WAY
- MAKE MORE MONEY FOR YOU
- RECORDS SHOW 40% MORE HOLES
- LIST OF USERS ON REQUEST

Heavy Powerful Rugged

FOR VERTICAL *OR HORIZONTAL* BLAST HOLE DRILLING

At an open-cut mine in Muswellbrook, Australia, Theiss Bros. Proprietary Ltd., was confronted with a difficult blast hole drilling problem. Shot holes for overburden removal had to go through hard slate and conglomerate. In spite of these unusual conditions Theiss Bros. averaged 300 feet of 6- to 8-inch holes per day using a truck-mounted McCarthy Vertical Blast Hole Drill. They say there's nothing better. Holes averaged 16 feet deep, but in some cases reached 46 feet. For further information on this rugged, dependable drill write Salem Tool Company and a representative will call on you.

At the famous Jurassic iron ore system in England, heavy limestone has been encountered under soil and boulder clay before reaching the ironstone. The 20-ft. slab of limestone is broken up for the dragline by the dependable McCarthy Horizontal Blast Hole Drill. Highwall is protected and left virtually intact by buffer blasting. Blast holes are drilled 60 feet deep with explosive charges being placed in the back 50 feet. Space behind the open cast gelignite is stemmed with sand. The McCarthy Blast Hole Drill is specially mounted on a shovel for faster positioning up along the wall. Three tons of explosives are usually detonated in one blast. McCarthy Auger Drills are in use all over the world for many purposes. Write Salem Tool Company direct and our representative will call on you.

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MANUFACTURED BY

THE SALEM TOOL COMPANY

763 SOUTH ELLSWORTH AVE. . . SALEM, OHIO, U. S. A.

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(Classified Advertising)

EMPLOYMENT: BUSINESS: **"OPPORTUNITIES"** :EQUIPMENT :USED OR RESALE

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$1.20 a line. Minimum 3 lines. To figure advance payment count 5 average words as a line.
Positions Wanted and Individual Selling Opportunity Wanted undisplayed advertising rate is one-half of above rate, payable in advance.
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Discount of 10% if full payment is made in advance for 4 consecutive insertions.

Individual Spaces with border rules for prominent display of advertisements.
The advertising rate is **$9.25** per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
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SEND NEW ADVERTISEMENTS to New York Office, 330 W. 42nd St., N. Y. 36 for August Issue closing July 17th.

POSITION VACANT

ECONOMIST WANTED—TVA wants qualified applicants for the position of Chief, Fuels Economics Section, Chattanooga, Tennessee. This Section is responsible for forecasting fuel requirements (principally coal); analyzing costs of fuel and forecasting changes in such costs; recommending size and timing of invitations for bids, nature and term of contracts, provisions for cancellation, escalation, etc.; and analyzing comparative coal transportation costs. A college graduate with 5 to 10 years' experience in such work with some supervisory responsibility is desired. Entrance salary is $7500 a year for 40-hour week. Vacation, sick leave, and retirement benefits. Write to Tennessee Valley Authority, Division of Personnel, Knoxville, Tennessee.

WANTED

12 Willley or Deister Concentrating tables with head motions.

W 7723 Coal Age
68 Post St., San Francisco 4, Calif.

WANTED

HOISTS

NEED two large 2-drum mine shaft hoists with electrical equipment. Write
W 6900 Coal Age
330 W. 42nd St., New York 36, N.Y.

BUYERS OF SURPLUS COPPER INSULATED WIRES AND CABLES

No lengths too long or too short
Telephone: Eastgate 7-4778
PIERCE CABLE CO.
2664 Clybourn Ave. Chicago 14, Illinois

Wanted Goodman duckbills with or without drives, pans, ball frames. Any size.

AUTO GEAR & PARTS CO.
5904 Mignonette St., Pittsburgh 6, Pa.

FOR QUICK SALE!!

HIGH PROFIT STRIP MINE NEAR PITTSBURGH, PENN.

This business shows a steady 35% net profit after management salaries, depletion, etc. Operation will bear rigid investigation. Property includes, 1,200 acres on a long term royalty lease, with an estimated 5,000,000 tons of coal easily accessible. Nearby Pittsburgh industries assures steady demand. Equipment and buildings are in excellent condition and include: 1 Model 1201 Lima shovel, 1 Bay City shovel, 2 Model TD-18 bulldozers, McCartney drill, pumps, hose, tools, etc., age. Sale price, including complete inventory, is only $208.000.

FOR COMPLETE DETAILS AND DATA REFER TO PA 388

ALLSTATE BROKERAGE CORPORATION
79 W. Monroe Street
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CARLYLE
INDUSTRIAL RUBBER PRODUCTS FOR EVERY PURPOSE

IMMEDIATE DELIVERY OF CONVEYOR, ELEVATOR AND TRANSMISSION BELTING — PIPE, WATER, SUCTION, AIR, STEAM AND WELDING HOSE

WHY WAIT

We have 8 to 48

RUBBER CONVEYOR BELTING

TOUGH COVERS—heavy duty, specially compounded abrasive resistant rubber covers having high tensile strength. Thoroughly capable of withstanding the abrasive action of bulk materials. Properly vulcanized to the carcass to assure utmost performance, economically.
STRONG CARCASS—Constructed of finest quality 28 and 32 ounce tough cotton duck, properly treated and impregnated to avoid mildew from moisture and atmospheric conditions. Each ply thoroughly embedded in rubber to prevent ply separation.
FLEXIBILITY — Careful attention has been given in the construction of all belts to have the proper flexibility assuring the following desirable features: troughs easily, runs true on all idlers, gouge resistant, excellent for long and short hauls and slope installations.

Avoid delays in your production schedules!

We carry in stock for your immediate requirements, Conveyor Belting in widths from 8 inches to 48 inches

Width	Ply	Thickness Top Cover	Thickness Bottom Cover	Type of Duck Carcass
8"	4	1/16"	1/32"	28 Oz.
10"	4	1/16"	1/32"	28 Oz.
12"	4	1/16"	1/32"	28 Oz.
14"	4	1/16"	1/32"	28 Oz.
16"	4	1/8"	1/32"	28 Oz.
18"	4	1/8"	1/32"	28 Oz.
20"	4	1/8"	1/32"	28 Oz.
20"	5	1/8"	1/32"	28 Oz.
24"	4	1/8"	1/32"	28 Oz.
24"	5	1/8"	1/32"	28 Oz.
26"	5	1/8"	1/32"	28 Oz.
30"	4	1/8"	1/16"	32 Oz.
30"	5	1/8"	1/16"	32 Oz.
30"	6	1/8"	1/16"	32 Oz.
36"	6	1/8"	1/16"	32 Oz.
42"	5	1/8"	1/16"	32 Oz.
48"	5	1/8"	1/16"	32 Oz.
48"	6	1/8"	1/16"	32 Oz.

INQUIRE FOR SIZES NOT LISTED.
ELEVATOR TRANSMISSION & V-BELTING ALSO IN STOCK.

All our belting made by the leading belting manufacturers.

Write for Free Booklet on Installation, Care & Maintenance of Conveyor Belting.

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Phone Digby 9-3810

FOR SALE

1—24 x 30 Erie ball engine directly connected to Westinghouse 300 K.W. 250 Volt. 1200 Amp. 150 R.P.M. Interpole compound wound direct current generator.
1—Ideal 18" x 19" Horizontal slide valve engine directly connected to 175 K.W. Triumph direct current generator 225-235 Volt. 532 Amp. 200 R.P.M.
1—Allis Chalmers Synchronous Converter, D.C. Volts No. Load 250 Full load 250 Amp. 1200 A.C. Volts 185 Amp. 600 PH. 6 Cycles 60 R.P.M. 1200.
With transformer and switch panel.
ALSO Misc. sizes of 220 Volt D.C. motors starting boxes and switch.

Yours truly,
The Nivison-Weiskopf Company
Reading 15, Ohio

FOR SALE

15 KW HILL GENERATOR SET
Model 4R diesel — radiator cooled — 1450 RPM—32.1 HP—120/240 volts DC—3 wire—compound wound—drip-proof.

30 KW SHEPPARD GENERATOR SET
30 KW — 115 volts DC—compound wound—240 amps. — radiator cooled. Sheppard model 12 4x5 diesel — rebuilt 1953—excellent condition.

30 KW GM GENERATOR SET
3-71 2 cylinder 4½x5 diesel—radiator cooled—electric starting. Delco 440/60/3 generator—with switchgear. Skid mounted—portable.

75 KW WAUKESHA GENERATOR SET
75 KW—230 volts DC—totally enclosed, self-contained. Waukesha 6 cyl., 160 HP, 1200 RPM diesel driving 75 KW 1200 RPM G.M. marine type generator. Self-contained switchboard and radiator.

100 KW AC GENERATOR SET
Lorimer 5 cylinder 700 RPM diesel—electric starting—440/60/3 with switchgear.

100 KW GM GENERATOR SET
Model 3-268A diesel—440/60/3 AC

300 KW GM GENERATOR SET
GM 8 cyl. 6½x7 diesel model 8-268A—120/240 volts DC — 1250 amps. — 1200 rpm — with switchgear.

SUPERIOR HEAVY DUTY DIESEL
510 HP at 360 RPM—5 cylinder—14½x18—type ZDSB—non-reversing—vertical—4 cycle—cold starting—mechanical injection. Engine totally enclosed. Complete with 48" 7 groove V-belt sheave and new spare parts. For heavy duty pumping, dredge service, power generation, textile and saw mills, mining, etc. Excellent condition. For immediate delivery.

(1) 300 GPM ELECTRIC PUMP
146' head bronze centrifugal pump—driven by 20 HP 230 volt motor.

(1) 1000 GPM SUBMERSIBLE PUMP
70' head — 25 HP 440/60/3 motor — self-contained 6" pump.

AXIAL FLOW FANS — AC & DC

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Curtis 7-5050

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18 Type 5SC-2PD
JOY SHUTTLE CARS
(Battery Type)
with batteries and chargers. Write us for any kind of mining equipment.

Industrial Machine & Electric Co.
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Phone 5764

FOR SALE
New 500 Gal. Skid Mounted
STORAGE TANKS
Shell of ¼" Steel, 2" Outlet and 12" Manhole in Top.
LEFTON INDUSTRIAL CORP.
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EIGHT YARD
MARION
ELECTRIC SHOVEL
FOR SALE
AT BARGAIN PRICE

Type 300, Serial No. 4321, 85 foot Boom, 54 foot Stick, on Crawlers. A.C. 2300/4000 Volts 60 Cycle 3 Phase. Michigan Location. Inspection Invited.

GREAT LAKES EQUIPMENT CO.
217 FIRST ST.
TOLEDO 5, OHIO
Phone LEnox 4418

FOR SALE
Page 623 Diesel Walking Dragline, 130-ft. boom, 9 cu. yd. bucket—$140,000.00 loaded on cars.
Page 625 Electric Walking Dragline, 130-ft. boom, 9 cu. yd. bucket—$150,000.00 loaded on cars.
Manitowoc Model 3500 Power Shovel, 45-ft. boom, 34 ft. sticks, 2 cu. yd. bucket—$35,000.00 loaded on cars.
Northwest Model 80-D, 3½ yd. coal dipper, $30,000.00 loaded on cars.
Equipment in excellent condition, now working in near East.

Sunnyhill Coal Company
P. O. Box 7931, Pittsburgh 16, Pa.

REPOSSESSED
WILL SELL FOR BALANCE DUE
Heavy Duty Vibrating Screen: 3 deck, 5'x14'
Troughing Idler 100 ft., 24" New Belt
Conveyors 130 ft., 30" New Belt
Plate Feeders: One Large; One Medium
Truck Scales: 40 x 10 ft. — 40 Ton
45 x 10 ft. — 50 Ton
Portable Steel Preparation Plants
All guaranteed like new. Must liquidate.

C & G MORTGAGE COMPANY
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Columbus, Ohio, Phone: GArfield 2186

FOR SALE
Lima 1201 Dragline, Serial No. 4527. New in 1948, one owner, good condition. Address Comet Collieries, Inc.,
P.O. Box 11, Linton, Indiana.

We have recently purchased several complete coal plants and have available an excellent stock of all types of machinery. Below is just a partial listing of our complete stock of mining, electrical and industrial equipment.

LOCOMOTIVES

1—1½ ton Mancha "Trammer", 18" ga.
1—2 ton Whitcomb, battery, 24" ga.
1—4 ton Mancha, battery, 24" ga., with Edison batteries and charging set
1—4 ton Ironton, battery, 36" ga.
2—7 ton G. E. permissible battery, 36" ga.
1—7 ton Atlas, battery, 36" ga.
3—8 ton Ironton, 36" ga.
2—8 ton General Electric, battery 36" ga.
4—10 ton Atlas, battery, 36" ga.
1—3 ton Whitcomb gas engine driven, 24" ga.
1—2½ ton Jeffrey trolley, 36" ga.
1—4½ ton Goodman trolley, 36" ga.
1—5 ton Jeffrey trolley, 36" ga.
1—6 ton Goodman trolley, 36" ga.
2—8 ton Goodman trolley, 36" ga.

COAL CRUSHERS

1—24" x 24" Jeffrey Single Roll
1—24" x 36" McNally-Pittsburg Double Roll
1—30" x 45" Jeffrey Single Roll
1—30" x 16" Williams Pulverizer
1—36" x 40" Jeffrey Double Roll
1—36" x 48" Jeffrey Hammermill

TUGGER & SLUSHER HOISTS

2—5 HP Brownie Room Hoists
3—5 HP Sullivan RH single drum Room Hoists
1—7½ HP Sullivan double drum Slusher Hoist
2—10 HP Sullivan 3 drum Slusher Hoist
1—25 HP Sullivan 2 drum Slusher Hoist
1—Ingersoll-Rand Model 1H Air Tugger Hoist
1—Ingersoll-Rand Mod. 6HC Air Tugger Hoist
1—Ingersoll-Rand Model EU Air Tugger Hoist
2—6½ HP Sullivan Single Drum Air Tugger Hoist, 250 Volt DC
7—6½ HP Sullivan Double Drum Slusher Hoist, 250 Volt DC
1—Double Drum Sullivan Slusher Hoist Driven by Continental Gasoline Engine

ELECTRIC HOISTS

1—11 HP Vulcan #0 single drum
1—20 HP Vulcan single drum
1—22 HP Vulcan double drum
1—25 HP Vulcan single drum
1—30 HP Vulcan single drum
1—37 HP single drum
5—50 HP single drum
2—60 HP single drum
4—100 HP Box single drum
1—112 HP Vulcan single drum
1—145 HP Vulcan single drum
2—150 HP Vulcan single drum
1—375 HP Box single drum
1—600 HP Box single drum

BOX CAR LOADERS

2—Ottumwa 20 HP Box car loaders
3—Maniere 22 HP Box car loaders
1—Jeffrey 20 HP Box car loader

MINING MACHINES

2—7B Sullivan super short wall coal cutters
18—CE7 Sullivan coal cutters
1—CR3 Sullivan coal cutter
1—Jeffrey 28A coal cutter
6—Goodman 112-A coal cutters
1—Sullivan CH-11 ironclad shearing machine
1—Jeffrey 29-C Arcwall coal cutter

LOADERS & CONVEYORS

2—8BU Joy loaders
2—61EW Jeffrey elevating chain conveyors
1—61HG Jeffrey chain conveyor, 90'
1—61W Jeffrey chain conveyor, 200'
9—G-20 Goodman shaker conveyors
10—G-15 Goodman shaker conveyors
8—Vulcan shaker conveyors
2—Joy ladel UN-17 shaker conveyors
10—Goodman HA Juckbills

MINE FANS & BLOWERS

2—8-H Jeffrey 42" Aerodyne Fans
1—Jeffrey 8 x 4 Fan
5—Jeffrey A61 exhaust blowers
8—Jeffrey Aerodyne midget blowers

SCALES

3—100 ton Fairbanks railroad scales
1—100 ton Howe railroad scale
1—125 ton Howe railroad scale
1—5000# Fairbanks Tipple scale with weighing basket
1—5000# Howe Tipple scale

STORAGE BINS

3—50 ton capacity steel bins
2—100 ton capacity steel bins

TIPPLE EQUIPMENT

1—4 deck shaker screen 32' long in 2 sections, driven by 10 HP & 25 HP motors
1—4 deck card shaker screen, 18' long, driven by 50 HP motor
1—Card rotary car dumper
1—Bucket Elevator, 36'6" centers, 18" x 11" x 9" buckets.
1—Bucket Elevator, 45' centers, 6"x4" buckets
1—Bucket Elevator, 48'8" centers, 10" x 6" buckets
1—Jeffrey picking table, 19' centers, 36" wide
1—Jeffrey picking table, 19'8", 36" wide
1—Jeffrey Drag Conveyor, 88'6", 36" flights
1—Jeffrey Drag Conveyor, 72', 30" flights
1—Jeffrey Drag Conveyor, 67', 30" flights
1—Jeffrey Drag Conveyor, 69'6", 28" flights
1—Link Belt Drag Conveyor, 50', 15" flights
1—32" x 9'6" Card vibrating screen
1—4' x 6'6" Link Belt jig washer
1—Loading boom, 32'3" centers, 24" flights with 8' grizzly
1—Loading boom, 55' centers, 48" flights
1—Loading boom, 45' centers, 30" flights
2—Card self dumping mine cages
2—Card 84" bicycle sheave wheels
1—24" Belt conveyor, 40' centers
1—24" Belt conveyor, 13' centers
1—24" Belt conveyor, 135' centers
1—24" Belt conveyor, 66' centers
1—30" Belt conveyor, 173' centers
1—Red Devil egg loader, 16" flights
1—Ottumwa nut loader, 16" belt

ELECTRIC CABLE

1368'—#10 Parkway cable 3/c, 7200 volt
2977'—#8 Parkway cable 3/c, 7200 volt
262'—#8 Parkway cable 3/c, 600 volt
1900'—#6 Parkway cable, 3/c, 7200 volt
970'—#2/0 Parkway cable, 600 volt
2,098'—#6 Tirex cable, 600 volt, 3/c
1417'—#4 Tirex cable, 3/c, 600 volt
547'—#2 Tirex cable, 3/c, 600 volt
1022'—#12 new Tirex cable, 4/c, 600 volt
5250#—300,000 CM stranded w.p. 1/c
14122'—#1/0 stranded r.c., 1/c
16682'—#4 stranded r.c., 1/c
2300'—#4/0 stranded r.c., 1/c
1705#—#4 solid bare
5467#—#2 solid bare
2600#—#1 solid bare
1255#—#1/0 solid bare
2975'—type TTHFA-60 new telephone cable

PIT CARS

160—60 cu. ft. coal mine cars, wooden sides, 42" ga.
125—60 cu. ft. Card steel coal mine cars, 36" ga.
88—66 cu. ft. Card steel coal mine cars, 36" ga.

SHUTTLE CARS

2—Joy Shuttle Cars, Model 42D5.

RAIL

16, 20, 30, 40, 52, 60, and 80# relaying rail in stock

Send for free copy of illustrated booklet describing the famous Allen Lamp collection.

Since 1898 Dependable Reconditioned Machinery

MORSE BROS. MACHINERY CO.

2900 BRIGHTON BLVD. **EST. 1898** **DENVER 1, COLO.**

MINING MACHINERY FOR SALE

ROTARY CONVERTERS

1—150 KW, GE, 275 volt, Type HCC6, Form P, 1200 RPM, 2300/4000 volt transformers. Complete will all manual switch gear and 1200 Amp. Westinghouse automatic reclosing circuit breaker.

1—150 KW, Allis-Chalmers, 275 volt, 1200 RPM, 2300/4000 volt transformers, 1200 Amp. Westinghouse automatic reclosing circuit breaker.

LOCOMOTIVES

2—Jeffrey, MH 121, 4 ton, 24" above rail, electric motor driven reels, now 42" track gauge but will change, inside frames.

1—4 Ton Jeffrey MH96 42" track gauge, completely rebuilt and overhauled, with or without reel.

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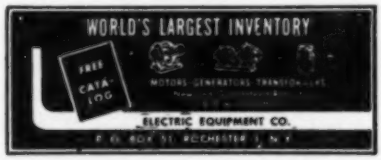

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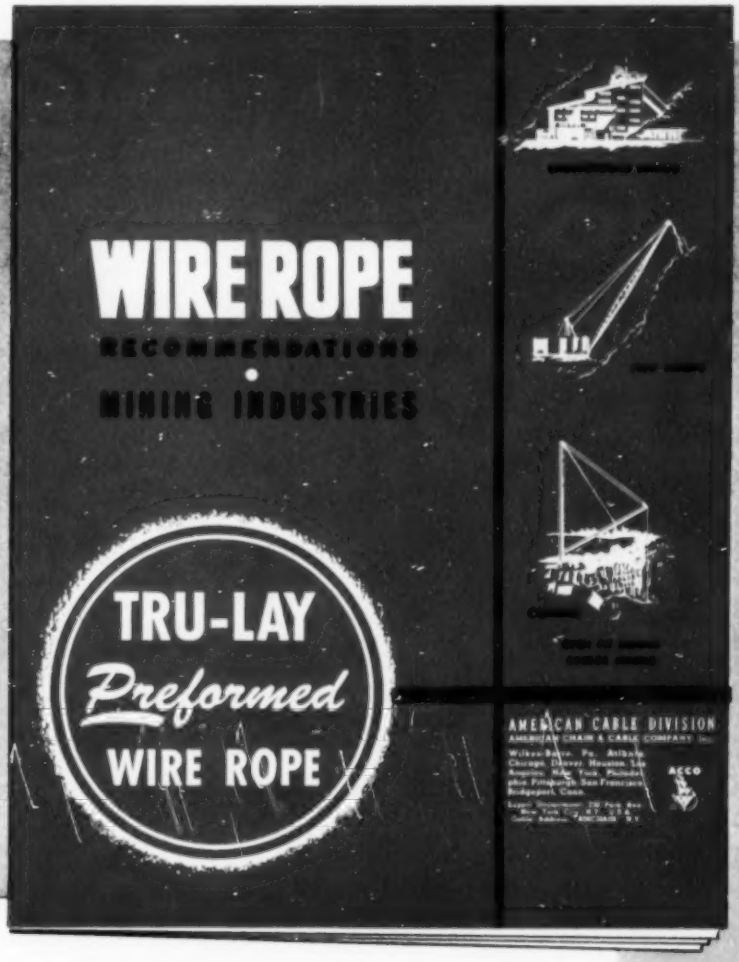

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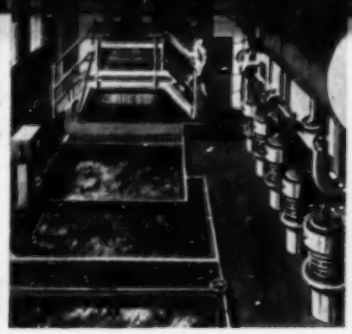

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